CANADA

ENGINEERING AND SCIENTIFIC MANPOWER RESOURCES IN CANADA

Their Earnings, Employment and Education, 1957

A professional manpower bulletin

ECONOMICS AND RESEARCH BRANCH
DEPARTMENT OF LABOUR
OTTAWA

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June 1959

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Their Earnings, Employment and Education, 1957

Professional Manpower Bulletin No. 7

ECONOMICS AND RESEARCH BRANCH
DEPARTMENT OF LABOUR, OTTAWA
June 1959

Hon. Michael Starr
Minister

A.H. Brown
Deputy Minister

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FOREWORD

This report was prepared in the Manpower Resources Division of the Economics and Research Branch of the Department of Labour by Mr. A.D. Boyd, under the supervision of Mr. P.H. Casselman and the direction of Mr. J.P. Francis. Mrs. D.C. French edited the manuscript and prepared it for publication.

A preliminary release of the findings of the survey on which this report is based was made in November, 1958.

The assistance of the architects, engineers, scientists and veterinarians who provided information on which the report is based, is gratefully acknowledged.

W. R. DYMOND,
Director,
Economics and
Research Branch,
Department of Labour

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INTRODUCTION

Who are included in the survey?

The data for this report were obtained from a group of the professional people who are enrolled in the Scientific and Technical Personnel Register of the federal Department of Labour.

The Register was developed during the Second World War to facilitate the allocation of Canada's scientific and technical manpower resources in accordance with established priorities. When wartime controls were relinquished, the Register was retained because of its possible value in any future emergency and because it was a major source of comprehensive information on a vitally important segment of the nation's labour force: the scientists and engineers.

Under wartime regulations, enrolment in the Register was mandatory for all persons with professional status in engineering, architecture, biology, chemistry, geosciences, mathematics, physics, agriculture, forestry, and veterinary medicine. Since the end of the war the Register has been maintained on a voluntary response basis with the assistance of universities and professional associations.

Only persons with university degrees in one of the specified fields, or with equivalent qualifications, as demonstrated by membership in an appropriate professional institute or association, are enrolled in the Register.

Returns completed by new university graduates have been the chief source of additions to the Register since compulsory registration was discontinued. The generally large response from university graduates has made it possible to maintain a high coverage. Immigrants and Canadians educated in other countries are enrolled in the Register mainly on the basis of membership records of professional associations, referrals by a limited number of the larger corporations, and in part also through referrals by the Executive and Professional Section of the National Employment Service, and by the Settlement Offices of the Department of Citizenship and Immigration.

Many professional associations admit immigrants to membership only after a stipulated period of residence in Canada and therefore the coverage of immigrants in scientific and technical professions may be lower than the coverage of native Canadians.

In 1951-52, the Department of Labour re-surveyed all registrants to bring the information on their experience, utilization and location up to date. With the passage of time, the 1951-52 data inevitably lost much of their value for current studies, while the demand for up-to-date information on the nation's scientific and technical manpower resources became more pressing. To meet this demand, the Department of Labour

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developed a program under which one-third of the Register will be surveyed each year.

This report contains some of the results of the second survey, made in 1958, in the current triennial cycle, A selection was made from a total list of 64,000 registrants comprising: (a) all persons from whom returns had been received in the 1951-52 survey, and university graduates of 1951-52 who were normally surveyed three years after graduation when they had become more firmly established in their professions; (b) all those who did not reply to the 1951-52 survey, graduates of the years 1953, 1955 and 1956 and some graduates of 1957; (c) all other persons added to the Register following referrals from various sources during the period 1951 to 1957. The number of persons in each group has been divided into three equal parts on a random basis, and the second part taken as the "population" for the 1958 survey.

It should be realized that this population is not entirely representative of Canada's resources of professional workers in scientific and technical fields. There is a relatively low coverage of immigrants, and a lack of data on those persons for whom no address was available. The data tabulated, in addition, excludes those who could not be reached because of incorrect addresses and those who did not reply to the survey. It may well be that the characteristics of the professionals who were heard from are in some ways different from the characteristics of those who did not reply or could not be reached.

Results of the 1958 Survey Operations

(a)	Total mailed survey	21,033
(b)	Not located by postal authorities	3,376
(c)	Delivered by postal authorities (a-b)	17,657
(d)	No response	4,389
(e)	Replies received (c-d)	13,268
(f)	*Per cent response (e of c)*	*75.1*
(g)	Replies removed before coding	1,086
	Retired	344
	Left Canada	284
	Deceased	203
	Insufficient information	94
	Housewives	93
	Others removed before coding	68
(h)	Replies received too late for tabulation	347
(i)	Respondents declared non-practicing	482
(j)	Replies tabulated (e–(g+h+i))	11,353

The breakdown of survey operations shows that over 62 per cent of the 21,033 questionnaires mailed were returned. Close to 3,500 questionnaires could not be delivered by the post office for one reason or another. About 75 per cent of those who were reached by the questionnaire replied.

Of the 13,160 questionnaires that were completed, 11,353 were tabulated. The returns not tabulated came in part from engineers, architects and scientists who had either retired, were not working in Canada, or were doing work which did not require their scientific or technical background. Some of the remaining returns showed that the addressees were deceased and others were received too late for coding.

In this report some of the data are broken down by field of specialization. In earlier surveys, except for those taken chiefly for roster purposes, respondents were classified by their specialty of greatest competence. In the 1957 and 1958 surveys, engineers and scientists were asked to indicate their specialization on the basis of their current or most recent employment. The actual classification was done by the respondents themselves from a coded list of several hundred specialties. These specialties were later grouped into broader fields. Of the 11,353 questionnaires tabulated, 558 were removed from all tables because the respondents were living outside Canada, leaving 10,795. Of these, 162 reported specialties not coming within any of the broader fields dealt with in this bulletin.

What type of information is provided in the report?

Thus this report covers 10,633 persons in every branch of engineering, architecture and the following fields of science: agriculture, biology, chemistry, forestry, geology and geophysics, mathematics, physics and veterinary medicine. Engineers are the largest group, comprising 55 per cent of the total, while architects make up 4 per cent. The natural sciences are represented by 38 per cent of the returns, and veterinary medicine by about 3 per cent. It should be noted that in some non-earnings tables, the science fields shown exclude agriculture and forestry. In all other tables, science includes agriculture and forestry.

The information from the second cycle survey which is presented in this bulletin is arranged in four chapters. The first chapter deals with the earnings of the respondents. The second contains data on their employment characteristics. The third chapter relates the respondents' employment to their educational background, while the fourth deals with educational background, particularly of those who took post-graduate study.

The data on salaries and other professional earnings relate to 1957, i.e., the last full calendar year before the survey, and exclude the earnings both of those respondents who worked less than ten months and those who were employed part-time in that year. "Salary" data represent annual earnings including salary, commissions, bonuses, etc., of respon-

dents who worked for employers. "Other professional income" data represent the earnings of persons working on their own account or in partnerships, as well as additional professional income earned by professionals outside their regular employment. "Total professional income" data include both salary and other professional income combined.

In all tables, the data on actual earnings relate to salaries. Separate tabulations, however, show the extent to which salaried persons derived additional professional income from other sources, as well as the proportion who received non-salary professional income only. Information on earnings was supplied by 90 per cent of the respondents who worked full-time for more than ten months during the year.

In this report 21 questions have been posed concerning this group of professional people, and the survey data have been used to answer them. Because of the large number of factors examined in the tables, resulting breakdowns have in some cases produced very low totals, and for this reason it is recommended that the reader study mainly the overall patterns which emerge.

Chapter 1 – EARNINGS

How much do scientific and technical professionals earn?

Median salaries in 1957 for engineers with a bachelor's degree only (including those with some post-graduate training but without a graduate degree) ranged from $4,600 for 1957 graduates to a peak of $10,600 for 1920-24 graduates **(Table 1)**. The median 1957 salary for scientists with a bachelor's degree ranged from $4,400 for 1957 graduates to $8,500 for those who graduated before 1915.

Engineers with post-graduate degrees did not appear, on the average, to have reached salary levels as high as those with undergraduate degrees only. Scientists with post-graduate degrees, on the other hand, had reached considerably higher salary levels than those holding only an undergraduate degree.

How do salaries of engineers and scientists vary with length of experience and level of education?

In general, the salaries of both engineers and scientists increased quite rapidly during the first dozen years of experience, then less rapidly, until a plateau was reached after about 20 years of experience. Subsequently, the trend of salaries was erratic, with some tendency for declines to occur for those who were still working full-time after 35-40 years of experience.

Despite this common pattern, there were some interesting differences and similarities in salary levels between those with undergraduate and post-graduate degrees. When engineers with post-graduate degrees entered the labour market they did not immediately earn as much as their former classmates who had secured employment as soon as they received undergraduate degrees. On the average, however, the lag was a brief one. Five years after the undergraduate degrees had been obtained, the salaries of both groups were approximately the same.

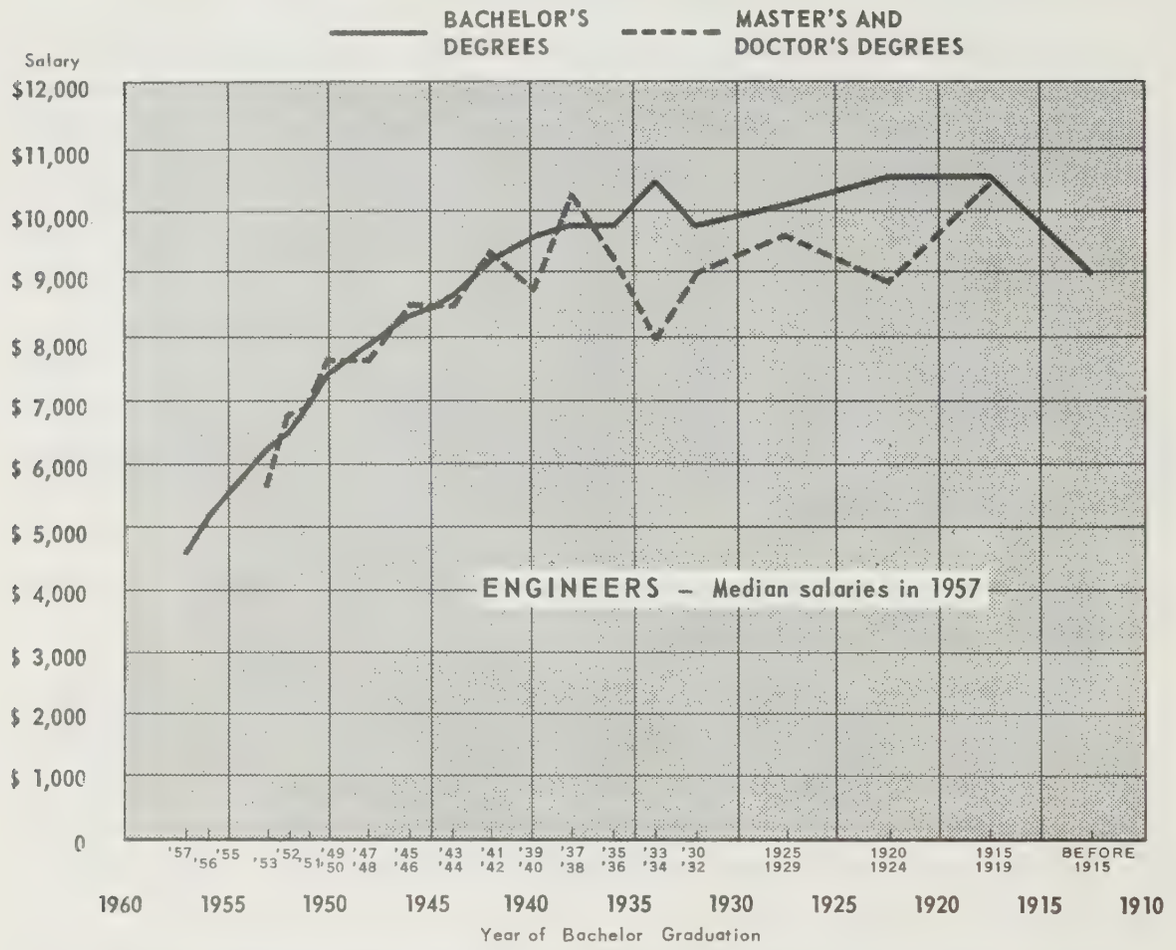
During the subsequent 15 years of experience (from five to 20 years after the undergraduate degree was obtained), the salaries of engineers with post-graduate degrees remained on the same general level as those of engineers who held a bachelor's degree only. Beyond this point, however, salaries of engineering bachelor graduates moved ahead of those of engineers who held master's and doctor's degrees.

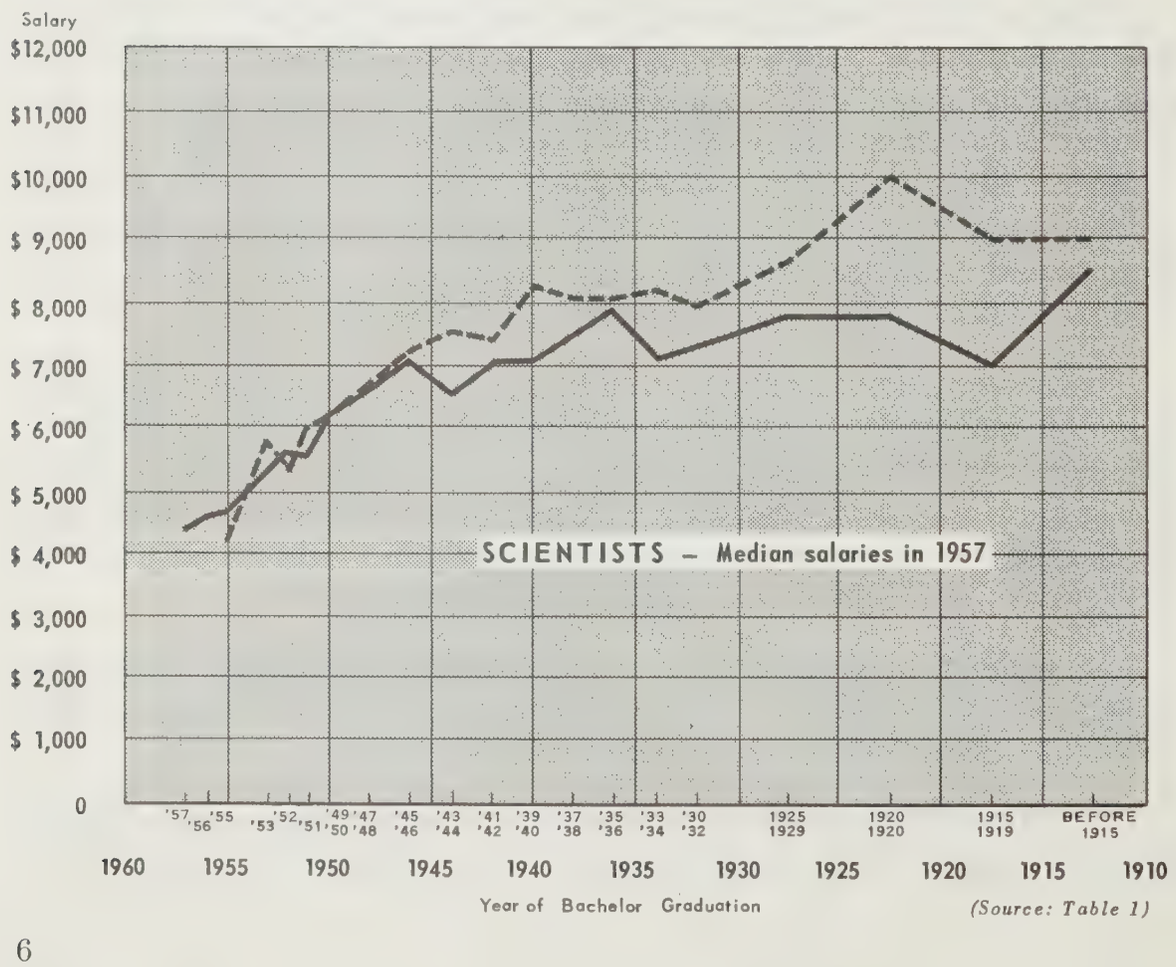
In respect to scientists, on the other hand, the data show quite clearly that those with post-graduate degrees eventually received markedly higher salaries than those with bachelor's degrees only.

As in engineering, salaries of scientists with post-graduate degrees initially lagged behind the earnings of those who held only a bachelor's

Chart 1

HOW DO SALARIES OF ENGINEERS AND SCIENTIST VARY WITH LENGTH OF EXPERIENCE AND LEVEL OF EDUCATION?





(Source: Table 1)

degree. However, six to eight years after bachelor graduation scientists who had obtained a post-graduate degree were earning more.

Not only did salaries of scientists with post-graduate degrees tend as experience increased to exceed and remain above the earnings of those with only bachelor's degrees, they also tended to be later in reaching a plateau—after about 35 years of experience compared to 20 years for scientists with bachelor-level training. As a result the salary differential between post-graduate degree and bachelor scientists became progressively wider as experience increased, ranging from minus $500 for those with post-graduate degrees when employment was first secured, to more than $2,000 after about 30 years of experience.

The data available do not provide a full explanation of the reasons why salaries of older engineers with undergraduate degrees exceeded those of older engineers with post-graduate degrees, whereas the pattern for scientists was the reverse. Some factors however, can be determined.

Table 23, for example, shows that a greater proportion of both engineers and scientists with single degrees than with post-graduate degrees were employed in industry. Since salaries in industry were generally higher than elsewhere, this would tend to raise the average earnings of those with undergraduate degrees above that of those with post-graduate degrees. This might explain the case for engineers, but since the reverse was true for scientists other factors must have weighed more heavily in their professional field.

One of the main influences appears to be that there was less shift of scientists with single degrees, as experience increased, into functions where earnings were relatively higher than was the case for single-degree engineers. **Table 12** shows that the proportion of 1948-1957 engineering graduates working in administrative, management and executive jobs was about the same for those with only bachelor's degrees as for those with post-graduate degrees, 9 and 10 per cent respectively. However, 46 per cent of the engineers who graduated before 1918 and held only a bachelor's degree were working in administration, whereas only 38 per cent of those with post-graduate training worked in administration.

Moreover, the proportion of engineers with post-graduate degrees appeared to increase with level of experience in the relatively lower-paid functions such as supervision, designing and draughting, testing and other miscellaneous activities, while the proportion of engineers with single degrees engaged in these functions decreased with length of experience.

The reverse is true in the case of scientists (**see Table 13**), where the proportion of single-degree persons performing lower-earning functions rose with the increase in experience. This, of course, would tend to keep salaries of scientists with bachelor's degrees lower than those earned by post-graduate degree people.

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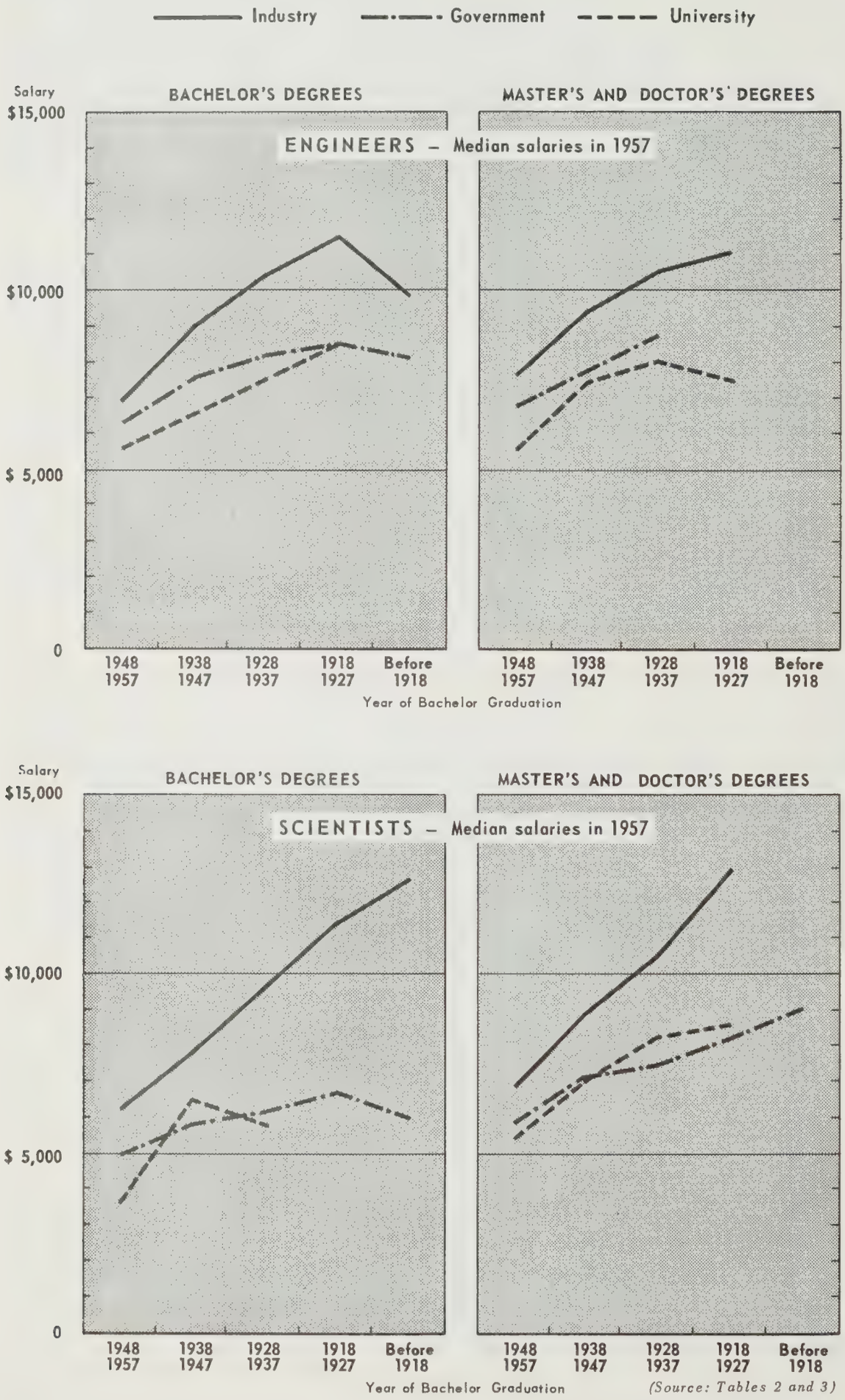
Chart 2

WITH WHAT KINDS OF EMPLOYERS ARE EARNINGS OF ENGINEERS AND SCIENTISTS HIGHEST?



(Source: Tables 2 and 3)

Another factor that might be mentioned is the salary trend in industry in the higher-paying administrative, management and executive functions. The salaries of persons in these jobs were much higher than average, especially for those with experience. The concentration in such jobs of older engineers with bachelor-level training made this, therefore, another factor tending to raise the salaries of bachelor graduates above those of engineers with advanced degrees. In contrast, the higher concentration of scientists in jobs outside industry meant that those in administrative functions tended to exercise a less buoyant influence on general salary levels.

The differing amounts of post-graduate education held by engineers and scientists is also a factor to be considered. A greater proportion of scientists with post-graduate education had doctor's degrees than was the case for engineers. **Table 24** shows that 7 per cent of the male engineers had master's degrees and 1 per cent had doctor's degrees, while 19 per cent of the male scientists had master's degrees and 21 per cent had doctor's degrees. There may be some association between the lower salary level of engineers with post-graduate training, and the fact that only a small proportion of engineers do have doctor's degrees.

What kinds of employers pay highest salaries to engineers and scientists?

Table 2 shows that, in 1957, industry paid the highest engineering salaries at all levels of experience and training. In all cases where the numbers represented by the figures are fairly large, the salaries of engineers employed by governments were next highest, and of those employed by universities the lowest.

Not only did engineers working in industry have the highest salaries, but the salary differential between them and those in other types of employment increased with experience. For example, in 1957 engineers in industry with single degrees who graduated in 1948-1957 earned $1,300 more than those employed by universities, while engineers in industry who graduated in 1918-1927 received $3,000 more in 1957 than their counterparts in universities.

Table 3 shows that earnings of scientists in industry, like those of engineers, were by far the highest at all levels of experience and training. Earnings of those with single degrees employed by governments and in high schools were next highest, with university-employed scientists receiving the lowest earnings.

There was an even greater tendency for the salary differentials of scientists in different types of employment to widen as experience increased than was the case for engineers. On the bachelor level, for example, the spread between the earnings of scientists employed in industry and government widened from $1,200 for 1948-1957 graduates to $4,700 in the case of 1918-1927 graduates.

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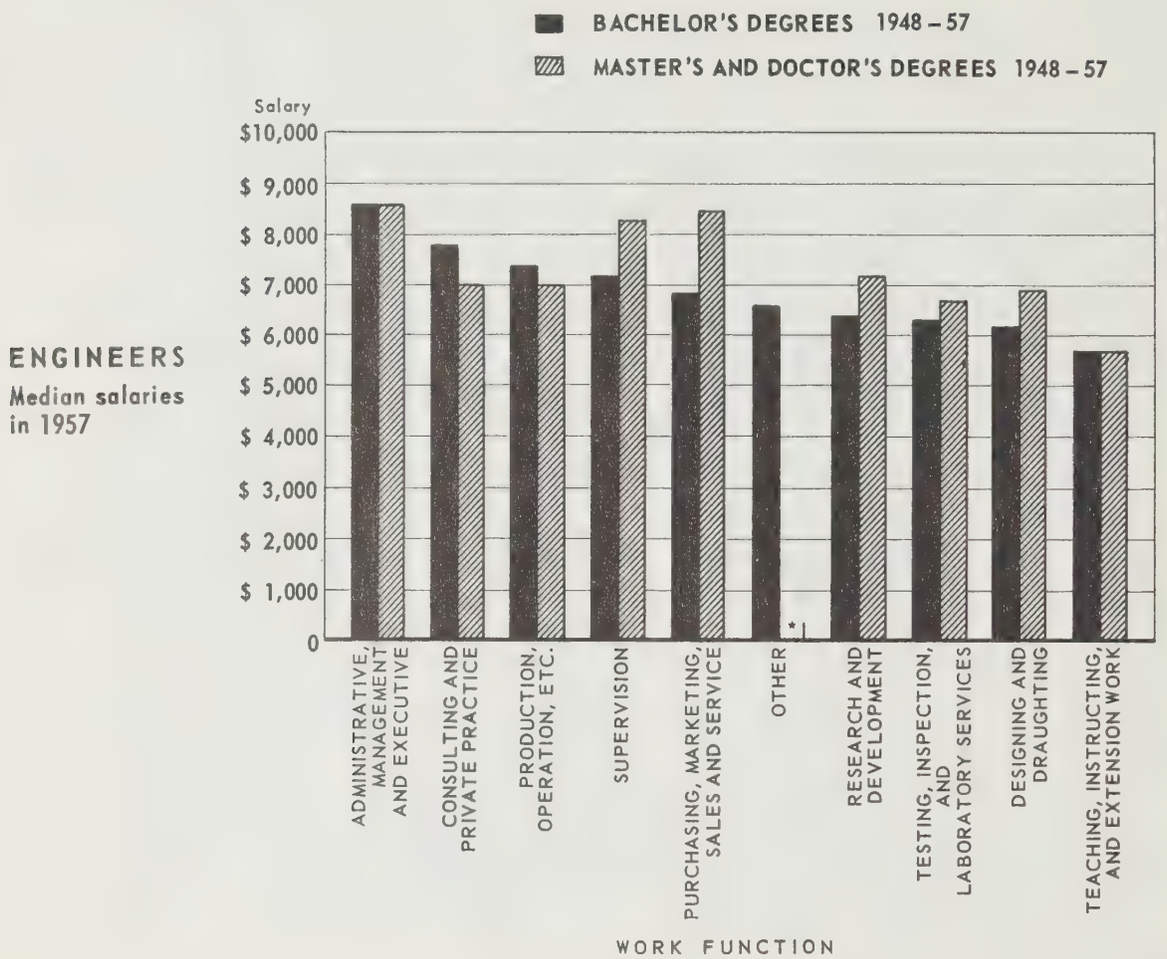
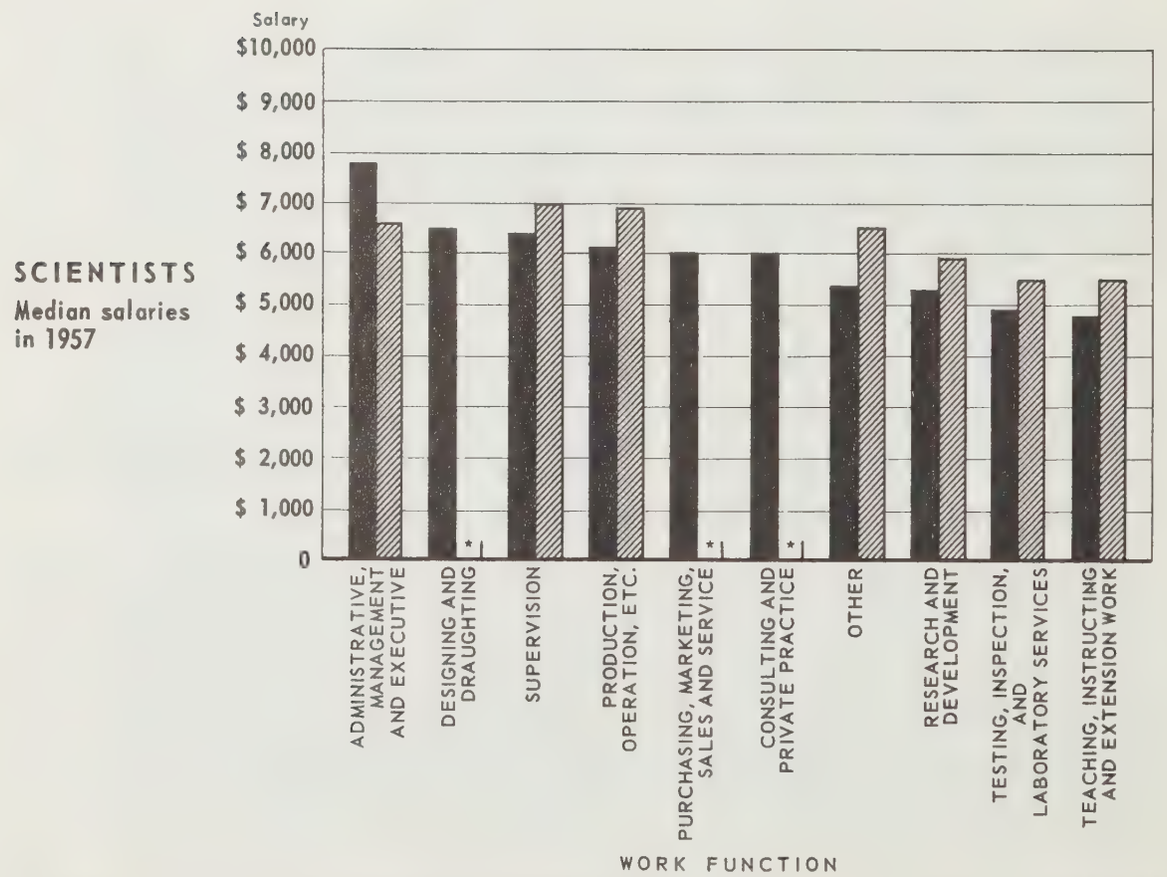
Chart 3

IN WHICH TYPES OF JOBS ARE SALARIES OF ENGINEERS AND SCIENTISTS HIGHEST?





* Number of cases too small to permit computation of median salaries.

(Source: Tables 4 and 5)

It is interesting to note that the salaries of scientists in industry increased more rapidly and more steadily with experience than was the case for engineers. The earnings of engineers in industry tended to level off as experience increased. In contrast, salaries of scientists employed in industry showed a strong and steady upward trend as experience increased.

The salaries of engineers and scientists employed by governments and universities showed different patterns as experience increased. In the case of engineers, the salaries of those in universities lagged behind the salaries of their government colleagues at all levels of experience. In the case of scientists, on the other hand, those employed by universities earned about the same as their colleagues in government at all levels of experience.

Which types of jobs pay highest salaries to engineers and scientists?

In **Table 4**, it can be seen that engineers doing administrative, management, and executive work received the highest median salaries in 1957, ranging from $8,600 for 1948-57 graduates with only one degree to $15,500 for 1918-27 graduates with a post-graduate degree. Consulting and private practice ranked next highest in all cases where the salary figures represented a fairly large number of individuals. Teaching, instruction, and extension work were most often lowest-paid, next lowest being testing, inspection and laboratory services.

Table 5 indicates that the same pattern observed among engineers was found among scientists. Those doing administrative and executive work earned the most, while scientists in teaching, and in testing inspection and laboratory services earned the least.

It should be noted that engineers doing administrative work had a broader and higher salary range than did scientists. For example, the 1957 salaries of engineers with one degree doing administrative and executive work ranged from $8,600 received by 1948-57 graduates to $13,700 earned by the 1918-27 group, a spread of about $5,000. In science, for those with comparable education and experience, earnings in administrative and executive work ranged from $7,800 to $10,500, a spread of less than $3,000.

How do the salaries of those in the different engineering and scientific fields compare?

The earnings of engineers were, on the average, $800 above those of scientists. **(See Table 6.)** Respondents in engineering fields earned on the average $7,900 in 1957, compared to $7,100 for scientists. In only one general field, geosciences, did scientists earn on the average as much as engineers in any field, and even here engineers' earnings in several fields were greater than those of geological scientists.

Median salaries of engineers ranged from $9,000 for those working in mining engineering to $7,600 for those in civil and chemical engineering.

With the exception of those in the geosciences, whose median salaries in 1957 were $7,800, scientists earned on the average from $7,300 in the case of chemists to $5,800 for those in agriculture.

In the case of architects, it is more meaningful to consider both the salary and non-salary earnings, since over one-third, being self-employed, received only a non-salary type of professional income. (See footnote (1), Table 6.) The survey results indicate a considerable difference in earnings between architects who received salary only and those who received professional income in other forms. Median annual salaries were $7,200, but those receiving non-salary income earned on the average $11,200 per year.

It was shown above that earnings of those in geosciences were relatively high compared to other science fields. One reason for this is indicated in **Table 18,** which shows that a greater proportion of persons in the geosciences performed the relatively high-paying functions of production, operation, etc., than was the case with other scientists.

The inter-quartile range is an indication of the representativeness of the median salary level. In general, as salaries or incomes increased, the spread between high and low salary levels increased; it was highest in architecture where the differential for non-salary earnings was $11,900. For those in metallurgical engineering, however, the inter-quartile range was lower than might be expected on the basis of the median salary level, indicating that there were somewhat less extreme levels of high and low salaries in this case.

In petroleum engineering, the size of the inter-quartile range in relation to the salary level indicated a slight tendency towards salary extremes--more very high and more very low salaries than occurred in other fields.

Do many scientific and technical persons receive their professional income in forms other than salaries?

Tables 7-9, presented by field, indicate that the extent to which scientific and technical personnel received non-salary professional income was related to their field of engineering, their type of employer, and their education.

About one-half of those employed in the fields of architecture and veterinary medicine received their professional income in whole or in part in a form other than salaries; this proportion represents mainly those who were self-employed. On the other hand, most engineers and scientists, 88 per cent, received their professional incomes in the form of salaries.

As to employers, the most notable uniformity was exhibited by those employed by governments, a high proportion receiving only a salary type of income. In all the broad professional fields covered, including architecture and veterinary medicine, from 73 per cent to 94 per cent of those employed by governments received all their professional income in the form of salaries.

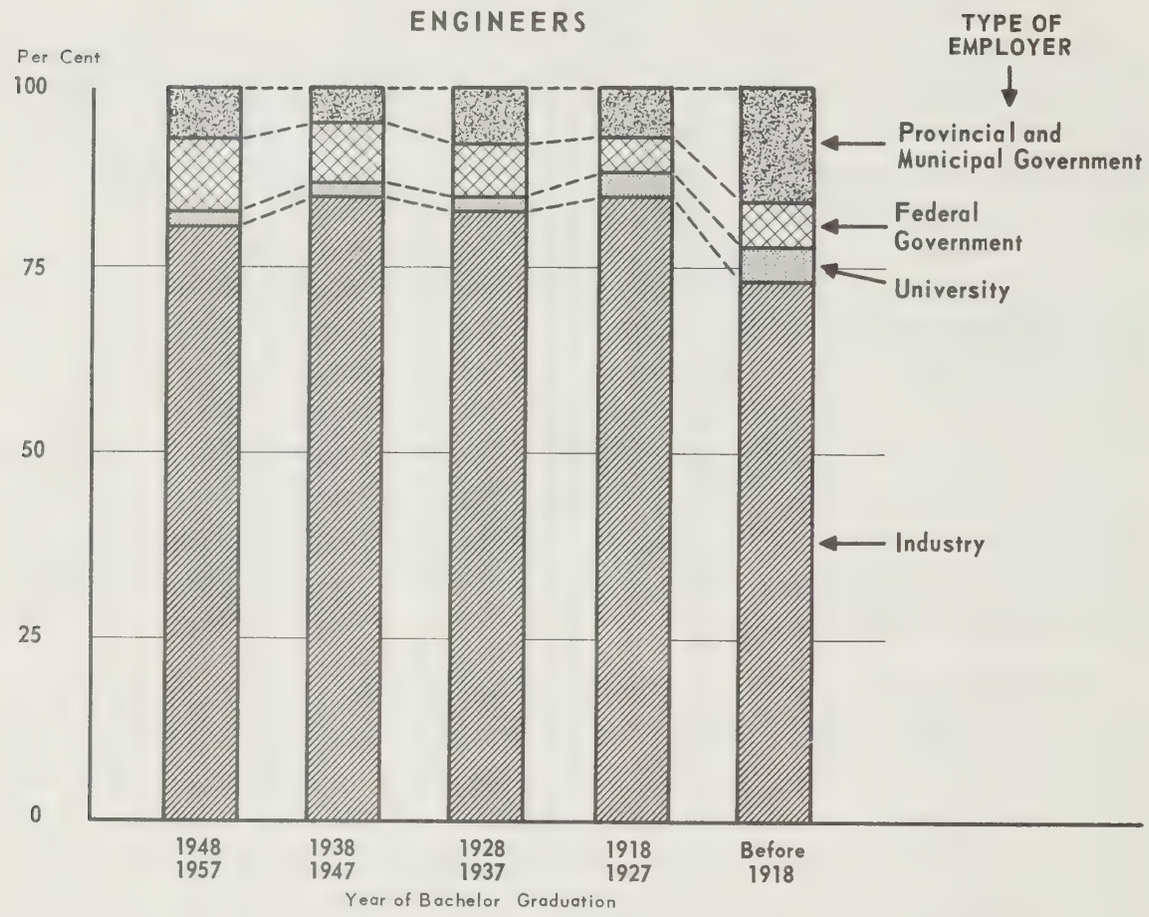
In contrast, a large proportion of the engineers and scientists employed by educational institutions tended to supplement their salaries with other forms of professional income. For example, 44 per cent of the engineers and scientists employed by universities received other professional income in addition to their salaries.

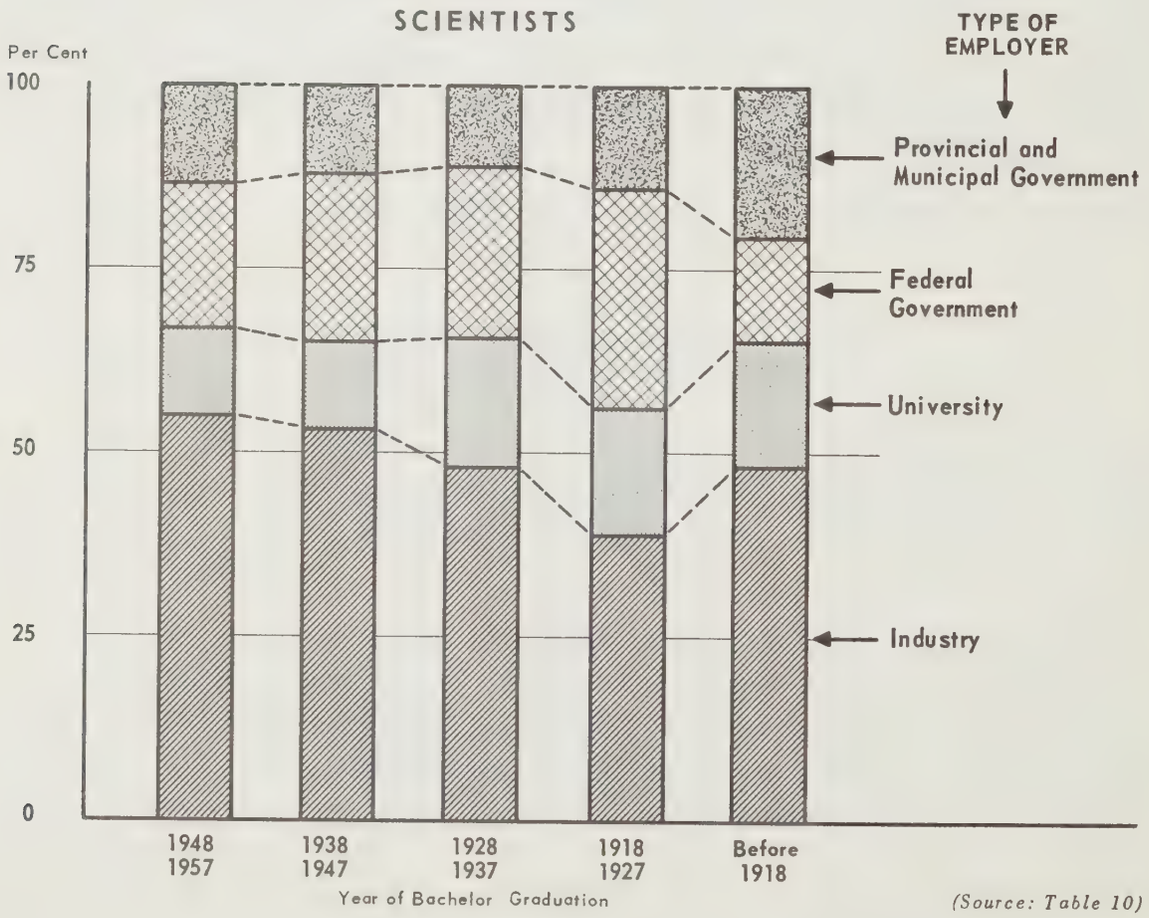
A wide variation is apparent in the industrial employment category. Here the greatest difference lies in the type of income earned by engineers and scientists on the one hand, and architects and veterinarians on the other. Most of the engineers and scientists employed in industry, 94 per cent, received all their professional earnings in the form of salaries. On the other hand, a large proportion of the architects and veterinarians working in industry, 45 and 79 per cent respectively, received all their professional incomes in a form other than salaries; these were the self-employed.

The third factor, educational level, appears to exert some influence on the type of income earned. Those on either end of the educational spectrum, those without degrees and those with post-graduate degrees, tended to supplement their salaries with other forms of professional income. Table 7 shows that in the case of engineers and scientists employed by the federal government, 95 per cent with bachelor's degrees received salary income alone. Five per cent of those with bachelor's degrees only and employed by the federal government supplemented their salaries with additional professional income, compared with 8 per cent of those holding doctorates.

Chart 4

WITH WHOM ARE ENGINEERS AND SCIENTISTS EMPLOYED, ESPECIALLY THE YOUNGER GRADUATES?





(Source: Table 10)

Chapter 2 – EMPLOYMENT

What kind of jobs do scientific and technical professionals hold?

Tables 10-15 outline the kinds of jobs held by scientific and technical personnel in 1957, and indicate how these differed between recent graduates and those with many years of working experience, and also between men and women. Generally, the survey findings show that the largest numbers of engineers and scientists were employed in industry. The largest single work function performed by engineers was administration and management, closely followed by production, operation, etc., while scientists were concentrated in research and development.

Who employs scientific and technical personnel, especially the recent graduates?

In 1957, by far the largest proportion of scientific and technical personnel were employed in industry, 70 per cent as Table 10 indicates. The next largest proportion were employed by the federal government, 14 per cent. The remainder were largely with other levels of government and in universities.

However, there were considerable differences among fields. For example, more engineers than scientists were in industry, 82 and 52 per cent respectively. The reverse was true in the federal government where 21 per cent of the scientists and 9 per cent of the engineers were employed. Architects, although strongly concentrated in industry, showed a greater tendency to be employed with provincial and municipal governments than with the federal government.

The employment pattern tends to change as experience increases. In most fields, the recent graduates were concentrated more heavily in industry than were those with more than 10 years of working experience. A greater proportion of the older groups were employed in universities and in provincial and municipal governments. Only 2 per cent of the 1948-1957 engineering graduates, for example, were employed by universities, compared to 3 per cent of those who graduated between 1918 and 1927.

In the case of recent graduates in the federal government, there is an interesting difference between engineering and science. A relatively larger proportion of younger than of older engineers were employed in the federal government, 10 per cent of the 1948-57 graduates compared to 5 per cent of the 1918-1927 group.

In science, the opposite was true with a larger proportion of more experienced graduates being employed by the federal government.

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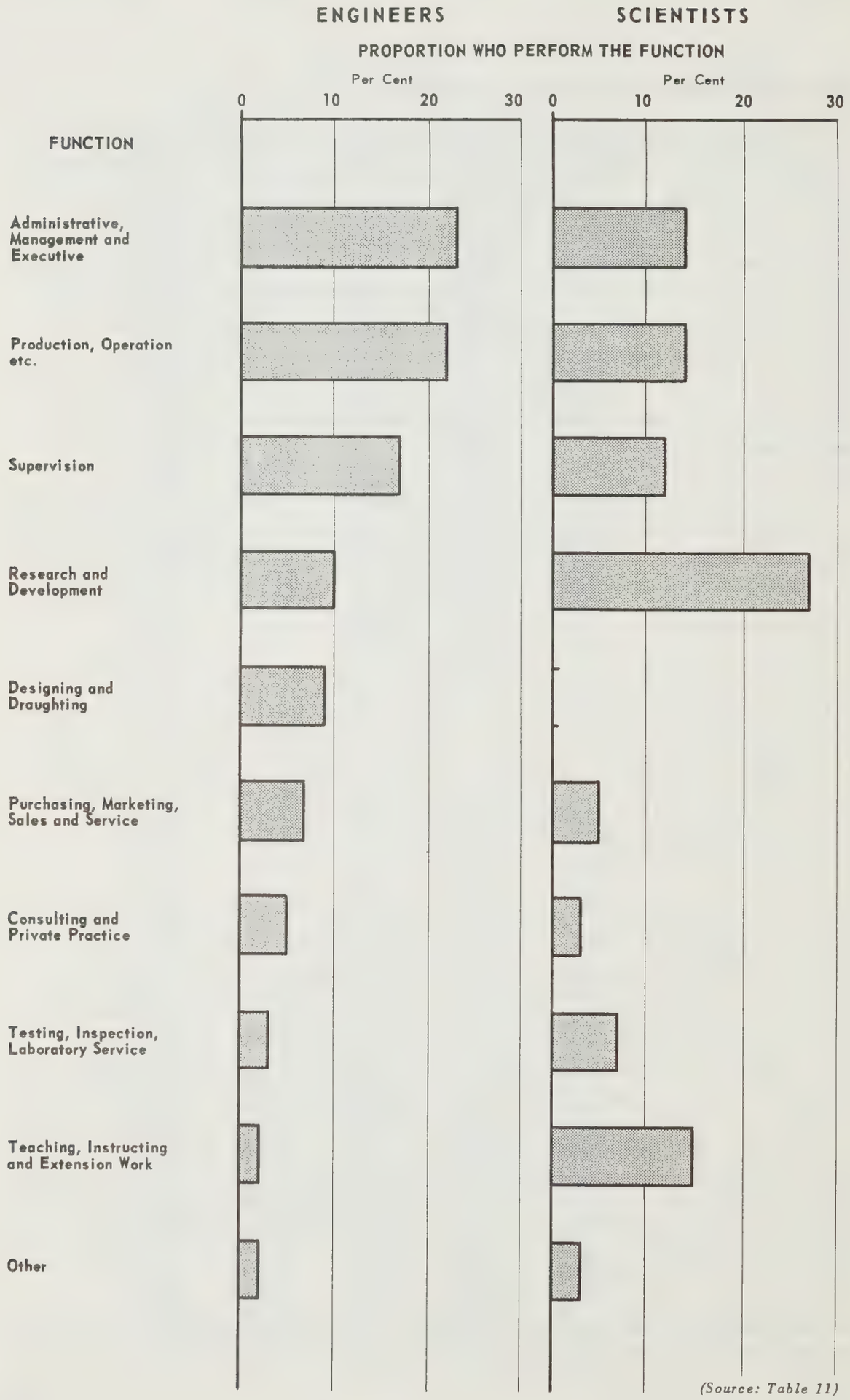
Chart 5

WHAT WORK FUNCTIONS ARE PERFORMED BY ENGINEERS AND SCIENTISTS?



(Source: Table 11)

What work functions are performed by men, women, younger graduates and those who have post-graduate degrees in scientific and technical fields?

In **Table 11,** it may be seen that in 1957 more engineers were in administrative, management and executive work than in any other single function, 1,368 out of 5,195 or about 23 per cent. The proportion in production, operation, etc. followed closely with almost 1,300 or 22 per cent performing this function.

In the case of scientists, on the other hand, the largest numbers were in research and development, which accounted for over 1,100 out of 4,000 or 27 per cent.

Although a very small proportion of the scientists were women, around 4 per cent, they were highly concentrated in certain occupations. A great majority of the female scientists were performing one of three functions: research and development; testing, inspection and laboratory services; or teaching. Even in testing and inspection jobs, however, where women were most numerous relative to men, they constituted only 13 per cent of all those performing this function.

In **Tables 12 and 13,** the association between work function, experience, and educational level is shown.

Table 12, which deals with engineers, indicates that the kinds of jobs they held in 1957 tended to change as experience increased. Younger engineering graduates with bachelor's degrees only were concentrated in such functions as production, supervision, designing, and research and development. In the case of experienced persons, a relatively greater proportion were in administrative, management, executive and consulting work. For example, 11 per cent of the engineers with single degrees who graduated between 1949-57 were in research and development compared to 5 per cent of the 1918-27 graduates.

In Table 13, which shows the job-experience pattern for scientists, the trend was also away from research and development towards administrative and executive work as experience increased.

The opportunities in administration were fewer for younger graduates owing to requirements for demonstrated ability and experience, which favour older persons. In addition, the concentration of younger graduates in research and development was probably a reflection to some extent of the increasing emphasis on research in recent years. An expansion of demand for personnel in research would tend to attract recent graduates in engineering and sciences.

From a future manpower resources point of view, it is significant to note that especially on the post-graduate levels the proportion of younger scientists in teaching was much lower than that of older graduates. Only 15 per cent of the 1948-57 graduates, compared to 29 per cent of the 1918-27 graduates, were in teaching jobs. This finding cor-

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responds to that indicated in **Table 10** which shows that relatively fewer of the more recent science graduates were employed by universities than was the case with those in the older age group.

Tables 12 and 13 indicate that in addition to experience, educational level influences the type of function performed. Engineers and scientists who have post-graduate degrees were found to a large extent to be performing such jobs as research and development, and teaching, while those with single bachelor's degrees predominated in production and operation, and in administrative and executive work. This is illustrated in Table 12 which shows that in the case of 1948-57 graduates, 28 per cent of those with post-graduate degrees were in research and development compared to 11 per cent of those who had only bachelor's degrees.

How old are the engineers and scientists in the different fields of specialization?

In 1957 the median age of scientists, excluding those in agriculture and forestry, was 35 years of age and that of engineers 37, as shown in **Table 14.**

Professional personnel in chemical and petroleum engineering, biological sciences, and physics had the lowest median age, 34. Those in mining engineering had the highest, 44.

In which scientific and technical fields are the greatest proportion of women found?

According to the results of this survey, illustrated in **Table 15,** women represented a very small proportion, only 2 per cent, of all those in scientific and technical professions. The proportion of women, however, was much higher in the scientific than in the engineering fields, 5 per cent compared to a fraction of 1 per cent respectively. In the sciences, the proportion of women to men was highest in biological science, namely 19 per cent.

Table 15 also shows the marital status of women in scientific and technical fields. About one third were married, this being a somewhat lower proportion than that of married women in the labour force as a whole, 43 per cent in 1957.(i)

(i) DBS, The Labour Force, Reference Paper No. 58, 1958 Revision.

Chapter 3 – RELATION BETWEEN EMPLOYMENT AND EDUCATION

What is the relation between present employment and educational background of scientific and technical personnel?

Briefly, almost four out of five graduates with only bachelor's degrees were employed in fields of employment specialization closely related to their academic course of study. This relationship as well as other related facts are brought out in **Tables 16** to **20.**

There appeared to be some association between undergraduate course and work function. Close to one-half of the engineers were doing either administrative, management and executive work or production, operation, etc., with about an equal proportion in each function (Table 17). In science, the largest proportion in any single function, about one-quarter, were in research and development (Table 18).

One out of three persons in the sample who took engineering or science courses in Canada was employed outside the province in which undergraduate education was received. An especially large proportion of students who received their scientific and technical undergraduate education in Maritime universities and in Manitoba and Saskatchewan institutions, about 65 per cent, went elsewhere to obtain employment (Table 19).

Are graduates with only bachelor's degrees employed in fields that are closely related to their academic courses of study?

Table 16 indicates that 5,486 out of 7,892 single-degree graduates, about 70 per cent, reported that they were employed in fields directly related to their academic course specializations. These percentages suggest that academic training as a rule utilized in the work being performed by qualified engineers and scientists.

Nevertheless, there remained about 30 per cent of the graduates who appeared to be in employment fields not as closely related to their academic courses of study. Of these, about 10 per cent had taken courses in some way related to their field of employment, as was the case for example with chemical engineering graduates who were working in petroleum engineering jobs. An additional 5 per cent had taken courses such as engineering physics for which there are no corresponding employment fields but which lead to jobs in a variety of different fields. The remaining 15 per cent, whose course of study and field of work did not correspond directly, can be viewed in two ways: first, from the point of view of the academic course they took and secondly in terms of the employment fields they entered.

From the first point of view, in regard to academic course, it appears that certain courses such as general science give students a type of training that leads to jobs in a wide variety of fields. Of the residual 15 per cent, about 4 out of 5 came in roughly equal proportions from general science, mechanical, chemical, and civil and electrical engineering. The remaining 1 out of 5 came from a variety of courses.

Looking at the problem next from the point of view of employment specialization, it may be noted that most of those who moved from one course or field to another studied within the broad fields of science or of engineering. Those employed in chemistry are a notable exception since 297 out of 787, or about two-fifths, graduated in chemical engineering.

The bulk of those in fields of employment specialization which did not appear to correspond closely to their academic courses come into fields such as chemistry, mechanical, civil, electrical and petroleum engineering, from courses such as general science, chemical, mechanical, and civil engineering. However, proportionately more graduates in chemical engineering and general science appeared to move to different fields of employment specialization than was the case for other courses.

A large number of those in aeronautical engineering came from other courses, but the majority, 46 out of 93, graduated in the closely related field of mechanical engineering. In the case of biology, mathematics and physics, it was found that a large number in these fields had graduated in general science.

In contrast, the proportion of persons who moved into the fields of veterinary medicine, agriculture and forestry from unrelated academic courses is quite small.

What kinds of work are performed by engineers and scientists with different course specialties?

The relationship between course of study and type of job performed by engineers with bachelor level training only is illustrated in **Table 17.** Almost one-quarter of the engineers were doing either administrative or executive work. An equal proportion were in production or operation, and the remainder were in the other eight functions shown. The tendency for graduates from certain courses to concentrate on a few kinds of jobs is brought out in this table.

One of the most distinct work patterns is shown by the civil engineering graduates, a large proportion of whom were engaged in production and operation, administration, supervision, designing and draughting, and consulting (29, 23, 15, 13 and 9 per cent respectively). On the other hand, less than 5 per cent of the civil engineers were in either research and development or purchasing, marketing and sales.

In some ways, chemical engineering provides a direct contrast to civil engineering. Whereas large proportions of civil engineering graduates were in consulting and designing and draughting, the proportions of chemical engineering graduates in such functions were very low, 3 and 6 per cent respectively.

The proportion of aeronautical engineering and engineering physics graduates in research and development, over one-quarter in each case, was over twice as high as the average for all engineers. A large proportion of the aeronautical engineering graduates were also in administrative and executive work. This type of work accounted, in addition, for a relatively large proportion of the graduates from mining, petroleum engineering, and mathematics and physics.

Engineering and business graduates were most highly concentrated in supervision and in purchasing, marketing, sales and service jobs.

Table 18 shows the relationship between course and function for those working in science fields. More scientists, over one-quarter, were in research and development than in any other separate function. An additional one-quarter were in either supervision or administrative, management and executive jobs, while the remaining one-half were performing other functions.

As shown in Table 18, graduates from the biological sciences and chemistry tended to be concentrated in research and development as well as in testing, inspection, and laboratory services, while a proportionately larger number of geological science and forestry and forest engineering graduates were in such functions as production and operation, and consulting. For example, one out of every two biological science graduates was in research and development compared to about one out of every five geological science and forestry graduates. In contrast, from 21-24 per cent of forestry and forest engineering graduates were in administrative, management, executive and supervisory work compared to 5-8 per cent of the biological graduates.

It is interesting to note that a relatively large proportion of those who graduated from the biological sciences and mathematics and physics were concentrated in teaching jobs. On the other hand, a very small percentage of graduates in forestry, forest engineering, and geosciences were in this type of work.

A large proportion of the physics and engineering physics graduates, almost one-half in each case, were doing research and development work. A larger proportion of general science graduates were in testing, inspection and laboratory service jobs than was the case for graduates from any other course. Chemical engineering and agricultural science graduates held relatively more purchasing, marketing, sales and service jobs than did other graduates.

Are scientific and technical professionals employed in the province where they were educated?

The data in **Table 19** show that 5,157 out of 8,301, or 62 per cent of the undergraduates were employed in 1957 in the province in which they were educated.

Many students in scientific and technical courses who received undergraduate degrees from universities in the Maritimes, Manitoba and Saskatchewan, tended to obtain employment elsewhere, chiefly in Ontario. Only 99 out of 340, that is 29 per cent, of the students in this survey who graduated in New Brunswick were still employed there in 1957. Over 70 per cent obtained employment elsewhere. In contrast, 2,429 out of 3,072, or 79 per cent, of the persons in the survey who were educated in Ontario were still employed there in 1957. Only 21 per cent went outside Ontario to obtain employment.

It should be stressed that these figures do not show the migration of native-born students out of any particular province, because some of those who graduated from Maritime universities, for example, may have originally come from other provinces to study there and then returned home after graduation. In addition, the figures for those employed outside Canada, shown in the footnote to Table 19, understate the actual number who left Canada after graduation because data were incomplete for this group.

Table 20, which deals with those who have post-graduate degrees, shows the extent to which those who have received post-graduate training tend to leave the provinces where they studied. A smaller proportion of those who received post-graduate degrees subsequently moved from the province in which they studied than was the case for single-degree engineers and scientists. For example, 55-62 per cent of those who received post-graduate degrees from Maritime and Saskatchewan universities were employed elsewhere in 1957, compared to 63-71 per cent for those who received bachelor's degrees in universities in these provinces.

Chapter 4 – SCIENTISTS AND ENGINEERS WITH POST-GRADUATE TRAINING

What educational background have scientific and technical professionals?

The following **Tables 21-24** illustrate some of the educational characteristics of the scientific and technical professionals covered in the survey, with particular reference to those who have undertaken post-graduate work. The data relate only to those who were employed in Canada.

How many scientists and engineers have taken post-graduate study?

Of the 10,795 scientists and engineers reported in this survey, 2,522 or 23.3 per cent of them had taken post-graduate study, and of these 1,885 or 17.5 per cent had actually obtained a Master's or Ph.D. degree **(Table 23).**

The analysis shows that, in general, scientists have higher academic qualifications than engineers. For example, only 1 per cent of the males in engineering have doctorates compared to 21 per cent of those in science excluding agriculture and forestry (Table 23).

In the sample, women in science, again excluding agriculture and forestry, have somewhat lower educational qualifications than men (see **Table 24**). Fourteen per cent of the women have doctorate degrees compared to 21 per cent of the men. However, in agriculture, a larger proportion of women than men have doctorate degrees, 20 per cent as against 11 per cent.

Where do engineers and scientists take post-graduate study?

About one-third of the 2,518 post-graduates shown in **Table 21** received their post-graduate education outside Canada.

There are noteworthy inter-provincial differences in the number of students who leave their home provinces for post-graduate education. Over one-third leave Ontario and Quebec for post-graduate education, while over two-thirds leave the Maritime Provinces and Manitoba. The majority who leave Ontario and Quebec for post-graduate education go outside Canada, mainly to the United States. In contrast, of the two-thirds who leave the Maritimes and Manitoba, about one-third go outside Canada and over one-third go to Ontario and Quebec for post-graduate education.

On the receiving side, it is apparent that the central provinces receive the largest proportion of post-graduate students in scientific

and technical courses from other provinces. In the sample, out of 441 students who took their post-graduate degrees in Canada, but outside the province where they received their undergraduate education, 375 or 83 per cent went either to Ontario or Quebec. For example, Nova Scotia and New Brunswick together received only 10 post-graduate students from other provinces,but Ontario and Quebec together received 375 from all parts of Canada.

Do post-graduate students in scientific and technical courses follow the same academic course specialty that they studied as undergraduates?

Table 22 indicates that one half the group, or 2,522 post-graduate students, took courses on the post-graduate level in the same field as their undergraduate courses. If those who took closely-related courses are also included, the proportion who took similar courses on the undergraduate and post-graduate levels amounts to over 80 per cent. Thus, about 20 per cent, or one out of five, took a post-graduate course differing from the undergraduate specialization.

In tracing the relationship between undergraduate and post-graduate courses, cases where small numbers of persons are represented or where courses are given mainly on the post-graduate level and not on the undergraduate level (for example meteorology) are excluded from the analysis.

In the first place, in some post-graduate courses such as agriculture, chemical engineering and veterinary science, the proportion who had followed identical undergraduate courses is very high, from 88-91 per cent.

Secondly, some scientific and technical professionals had taken courses on the undergraduate level that were fairly similar to the post-graduate courses followed. In aeronautical engineering, physics and chemistry, from 44-67 per cent had taken undergraduate courses which, although different, were basically very similar to the post-graduate courses. Thirteen out of 30 persons who took post-graduate work in aeronautical engineering, had taken the closely-related course of mechanical engineering as undergraduates.

The third category represents those who had taken undergraduate courses different from the post-graduate courses. In such specializations as general science, mathematics and physics, and bacteriology, from 25-78 per cent had taken undergraduate courses which appeared to be quite different from the post-graduate courses later followed.

Looking at the question from the undergraduate side, a slightly different picture emerges. In the first place a large proportion, from 79-92 per cent, of students who took the undergraduate course of geological science, zoology, geography and physics continued to follow those science courses on the post-graduate level.

From 73-91 per cent of graduates in mathematics and physics, geological science, physics and chemistry and engineering physics took courses on the post-graduate level which are very similar to their undergraduate courses.

However, a substantial proportion, 33-98 per cent of graduates in general science, forest engineering, electrical engineering, forest engineering and general science followed post-graduate courses which were quite different from the undergraduate courses. In the case of general science it was apparent that the general background provided by this course served as a preparation for a wide variety of post-graduate courses.

Which employers have the highest proportion of scientific and technical professionals with post-graduate degrees?

The proportion of scientific and technical personnel with post-graduate education is higher in universities and the federal government than in industry. **Table 23** shows, for example, that 84 per cent of the engineers with only bachelor's degrees are in industry compared to only 63 per cent of those with doctor's degrees.

In both engineering and science, a slightly larger proportion with master's than with doctor's degrees work for the federal government, indicating a greater tendency on the part of those with master's degrees to be employed by the federal government.

To conclude, one point may bear re-stating. Because of the number of factors examined in these tabulations and the possibility of some margin of error where the numbers on which the figures are based are small, it is preferable to look at the general pattern rather than the individual details. The approach has been to provide considerable data that may be less valuable as positive conclusions than as a guide to further study.

TABLES

Table 1 – Median Salaries of Engineers and Scientists by Year of Bachelor Graduation and Level of Education, 1957

Year of Bachelor Graduation	ENGINEERS			SCIENTISTS		
	Number	Bachelor's Degree or Bachelor's With Some Post-Graduate Education	Master's and Doctor's Degrees	Number	Bachelor's Degree and Bachelor's With Some Post-Graduate Education	Master's and Doctor's Degrees
		$	$		$	$
Before 1915	60	9,000	--*	15	(8,500)	(8,900)
1915 – 1919	37	10,500	(10,500)	40	7,000	8,900
1920 – 1924	233	10,600	8,800	142	7,800	9,900
1925 – 1929	257	10,100	9,600	202	7,800	8,700
1930 – 1932	181	9,800	9,000	143	7,300	8,000
1933 – 1934	191	10,500	8,000	138	7,100	8,200
1935 – 1936	172	9,800	9,300	148	7,900	8,100
1937 – 1938	188	9,800	10,300	149	7,500	8,100
1939 – 1940	196	9,600	8,800	177	7,100	8,300
1941 – 1942	219	9,200	9,300	170	7,100	7,400
1943 – 1944	219	8,700	8,500	155	6,600	7,600
1945 – 1946	244	8,300	8,500	171	7,000	7,200
1947 – 1948	448	7,900	7,700	314	6,600	6,700
1949 – 1950	889	7,400	7,700	651	6,200	6,200
1951	326	6,900	6,900	200	5,600	6,000
1952	114	6,500	6,800	84	5,700	5,400
1953	202	6,300	5,700	108	5,300	5,800
1955	179	5,600	--*	104	4,700	4,200
1956	234	5,200	--*	122	4,600	--*
1957	45	4,600	--*	25	4,400	--*
Net Total	**4,634**	–	–	**3,258**[2]	–	–
Not Included	1,281[1]	–	–	785[3]	–	–
Total	5,915	–	–	4,043	–	–

* 1 – 4 cases.
( ) 5 – 9 cases.
[1] This is made up of 538 who worked either part-time or less than 10 months during the year; 428, including 48 non-graduates, who supplied no salary information; seven 1954 graduates; and 308 non-graduates who did supply salary information.
[2] Includes 31 in geography.
[3] This is made up of 465 who worked either part-time or less than 10 months during the year; 259, including 4 non-graduates, who supplied no salary information; three 1954 graduates; and 58 non-graduates who gave salary data.

Table 2 – Median Salaries of Engineers by Type of Employer, Level of Education and Year of Bachelor Graduation, 1957

Level of Education and Year of Bachelor Graduation	Number	TYPE OF EMPLOYER			
		Industry	Government (Federal, Provincial and Municipal)	Universities	High Schools, Technical and Commercial Schools
		$	$	$	$
Bachelor's Degree, and Bachelor's with Some Post-Graduate Education					
Before 1918	78	9,900	8,100	--*	–
1918 – 1927	355	11,500	8,500	(8,500)	–
1928 – 1937	655	10,400	8,200	--*	--*
1938 – 1947	1,034	9,000	7,600	--*	–
1948 – 1957	2,115	6,900	6,300	5,600	–
Master's and Doctor's Degrees					
Before 1918	7	--*	--*	--*	–
1918 – 1927	35	11,000	--*	(7,500)	–
1928 – 1937	96	10,500	8,700	8,000	–
1938 – 1947	118	9,400	7,800	7,400	–
1948 – 1957	148	7,700	6,800	5,600	–
Net Total	**4,641**[1]	–	–	–	–
Not Included	1,274[2]	–	–	–	–
Total	5,915	–	–	–	–

* 1 – 4 cases.

( ) 5 – 9 cases.

[1] Includes seven 1954 graduates.

[2] This is made up of 538 who worked either part-time or less than 10 months during the year; 428 who did not supply salary information, including 48 non-graduates; and 308 non-graduates who did supply salary information.

Table 3 – Median Salaries of Scientists by Type of Employer, Level of Education and Year of Bachelor Graduation, 1957

Level of Education and Year of Bachelor Graduation	Number	TYPE OF EMPLOYER			
		Industry	Government (Federal, Provincial and Municipal)	Universities	High Schools, Technical and Commercial Schools
		$	$	$	$
Bachelor's Degree, and Bachelor's with Some Post-Graduate Education					
Before 1918	17	(12,700)	(6,000)	–	–
1918 – 1927	153	11,400	6,700	--*	(8,000)
1928 – 1937	295	9,600	6,100	5,800	6,600
1938 – 1947	515	7,800	5,800	6,500	6,400
1948 – 1957	1,083	6,200	5,000	3,600	4,500
Master's and Doctor's Degrees					
Before 1918	11	--*	(9,000)	--*	–
1918 – 1927	130	13,000	8,200	8,600	–
1928 – 1937	294	10,500	7,500	8,200	--*
1938 – 1947	358	8,900	7,100	7,000	–
1948 – 1957	403	6,900	5,900	5,400	--*
Net Total	**3,258**[1]	–	–	–	–
Not Included.	785[2]	–	–	–	–
Total	4,043	–	–	–	–

* 1 – 4 cases.

( ) 5 – 9 cases.

[1] Includes 31 in geography.

[2] This is made up of 465 who worked either part-time or less than 10 months during the year; 259 who did not supply salary information, including 4 non-graduates; three 1954 graduates; and 58 non-graduates who did supply salary information.

Table 4 – Median Salaries of Engineers by Work Function, Level of Education, and Year of Bachelor Graduation, 1957

Level of Education and Year of Bachelor Graduation	Number	WORK FUNCTION PERFORMED[1]									
		Research and Development	Designing and Draughting	Testing, Inspection and Laboratory Services	Production, Operation, etc.	Supervision	Administrative Management and Executive	Teaching, Instructing, and Extension Work	Purchasing, Marketing, Sales and Service	Consulting and Private Practice	Other
Bachelor's Degree, and Bachelor's with Some Post-Graduate Education		$	$	$	$	$	$	$	$	$	$
Before 1918	78	(9,300)	7,300	--*	7,600	8,500	12,500	--*	--*	(8,000)	--*
1918 – 1927	355	8,800	6,900	--*	9,000	8,800	13,700	9,100	9,500	(10,000)	(12,000)
1928 – 1937	655	7,900	7,700	7,200	9,100	9,200	12,500	--*	8,300	12,700	8,200
1938 – 1947	1,034	7,800	7,600	7,800	7,900	8,700	10,500	(7,200)	8,000	10,300	7,600
1948 – 1957	2,115	6,400	6,200	6,300	7,400	7,200	8,600	5,700	6,800	7,800	6,600
Master's and Doctor's Degrees											
Before 1918	7	--*	--*	--*	--*	--*	--*	--*	--*	--*	--*
1918 – 1927	35	--*	--*	--*	--*	(8,700)	15,500	--*	--*	--*	--*
1928 – 1937	96	(9,000)	7,600	(6,800)	--*	11,100	12,500	8,100	--*	--*	--*
1938 – 1947	118	8,200	(9,000)	--*	--*	8,500	10,300	7,300	--*	--*	--*
1948 – 1957	148	7,200	6,900	(6,700)	7,000	8,300	8,600	5,700	8,500	(7,000)	--*
Net Total	4,641[2]	–	–	–	–	–	–	–	–	–	–
Not Included	1,274[3]	–	–	–	–	–	–	–	–	–	–
Total	5,915	–	–	–	–	–	–	–	–	–	–

* 1 – 4 cases.
( ) 5 – 9 cases.

[1] "Production, operation etc." includes installation, erection, maintenance, layout and location, field exploration and construction. "Supervision" includes supervision of department, district, floor, section. "Other" includes writing, information services, library work, patents, personnel and safety, finance, budgetary control and other.

[2] Includes seven 1954 graduates.

[3] This is made up of 538 who worked either part-time or less than 10 months during the year; 428 who did not supply salary information, including 48 non-graduates; and 308 non-graduates who did supply salary information.

Table 5 – Median Salaries of Scientists by Work Function, Level of Education and Year of Bachelor Graduation, 1957

Level of Education and Year of Bachelor Graduation	Number	WORK FUNCTION PERFORMED[1]									
		Research and Development	Designing and Draughting	Testing, Inspection and Laboratory Services	Production, Operation, etc.	Supervision	Administrative Management and Executive	Teaching, Instructing, and Extension Work	Purchasing, Marketing, Sales and Service	Consulting and Private Practice	Other
		$	$	$	$	$	$	$	$	$	$
Bachelor's Degree, and Bachelor's with Some Post-Graduate Education											
Before 1918	17	--*	--*	--*	--*	--*	--*	--*	--*	--*	--*
1918 – 1927	153	7,200	--*	(5,700)	(7,200)	7,000	10,500	6,700	(6,500)	--*	--*
1928 – 1937	295	6,500	--*	6,000	6,600	7,300	11,500	6,100	(7,500)	--*	6,500
1938 – 1947	515	6,500	--*	5,700	7,400	7,300	9,300	5,700	8,000	--*	6,500
1948 – 1957	1,083	5,300	6,500	4,900	6,100	6,400	7,800	4,800	6,000	(6,000)	5,400
Master's and Doctor's Degrees											
Before 1918	10	--*	--*	--*	--*	--*	--*	--*	--*	--*	--*
1918 – 1927	130	8,100	--*	--*	--*	7,800	11,200	8,400	--*	--*	--*
1928 – 1937	294	7,800	--*	(6,000)	8,500	8,700	10,800	7,800	--*	(9,000)	(7,000)
1938 – 1947	358	7,300	--*	(6,600)	7,300	8,400	9,700	6,800	(7,500)	(9,000)	(7,500)
1948 – 1957	403	5,900	--*	(5,500)	6,900	7,000	6,600	5,500	--*	--*	(6,500)
Net Total	3,258[2]	–	–	–	–	–	–	–	–	–	–
Not Included	785[3]	–	–	–	–	–	–	–	–	–	–
Total	4,043	–	–	–	–	–	–	–	–	–	–

* 1 – 4 cases.
( ) 5 – 9 cases.
[1] "Production, operation, etc." includes installation, erection, maintenance, layout and location, field exploration, and construction. "Supervision" includes supervision of department, district, floor, section. "Other" includes writing, information services, library work, patents, personnel and safety, finance, accounting, budgetary control, and other.
[2] Includes 31 in geography.
[3] This is made up of 465 who worked either part-time or less than 10 months during the year; 259 who supplied no salary information, including 4 non-graduates; three 1954 graduates, and 58 non-graduates who did supply salary information.

Table 6 – Median and Quartile Salaries of Scientific and Technical Professionals by Field of Employment Specialization, 1957

Field of Employment Specialization	Number	SALARY			
		First Quartile	Median	Third Quartile	Inter-Quartile Range
		$	$	$	$
Architecture[1]	235	5,700	7,200	9,900	4,200
Engineering	4,949	6,500	7,900	10,000	3,500
Aeronautical	143	6,400	7,700	9,700	3,300
Chemical	234	6,400	7,600	10,000	3,600
Civil	1,299	6,300	7,600	9,700	3,400
Electrical	1,328	6,500	7,800	9,400	2,900
Mechanical[1]	1,161	6,600	8,100	10,500	3,900
Metallurgical	238	7,200	8,600	10,600	3,400
Mining	279	7,200	9,000	12,000	4,800
Petroleum	267	6,500	8,100	11,000	4,500
Science	2,012	5,700	7,100	8,900	3,200
Biological Sciences	231	4,600	6,000	7,700	3,100
Chemistry	1,063	5,900	7,300	9,200	3,300
Geology, Geochemistry and Geophysics	325	6,400	7,800	9,900	3,500
Mathematics	138	4,900	6,300	7,900	3,000
Physics	255	6,000	7,100	8,400	2,400
Agriculture[4]	902	4,900	5,800	6,900	2,000
Forestry[4]	377	5,500	6,700	8,400	2,900
Veterinary Medicine	146	5,200	6,200	7,100	1,900
Net Total	**8,621**	–	–	–	–
Not included	2,174[3]	–	–	–	–
Total	10,795	–	–	–	–

[1] Earnings of architects who received non-salary type professional income were: first quartile, $6,300; median, $11,200; third quartile, $18,200; inter-quartile range, $11,900.

[2] Mechanical engineering includes industrial engineering, naval architecture and marine engineering.

[3] Of these, 948 did not give salary information, 162 are in other scientific and technical fields, and 1,064 worked part-time or less than 10 months during the year.

[4] Agriculture includes agricultural engineering; forestry includes forestry engineering.

Table 7 – Type of Professional Income Earned by Engineers and Scientists, by Type of Employer and Level of Education, 1957

Type of Employer and Level of Education	Number	Per Cent	TYPE OF PROFESSIONAL INCOME EARNED					
			Salary and Other Professional Income		Salary Only		Other Professional Income Only	
			Number	Per Cent	Number	Per Cent	Number	Per Cent
INDUSTRY	5,753	100	47	1	5,395	94	311	5
No University Education	163	100	–	–	145	89	18	11
Some University Education	141	100	2	[3]	125	89	14	10
Bachelor's Degree	4,586	100	25	1	4,329	94	232	5
Bachelor's with Some Post-Graduate Education	256	100	5	[3]	235	92	16	6
Master's Degree	415	100	10	3	387	93	18	4
Doctor's Degree	192	100	5	[3]	174	91	13	7
UNIVERSITIES	467	100	205	44	258	55	4	[3]
No University Education	1	100	1	[3]	–	–	–	–
Some University Education	1	100	–	–	1	[3]	–	–
Bachelor's Degree	73	100	26	36	46	63	1	[3]
Bachelor's with Some Post-Graduate Education	25	100	12	48	11	44	2	[3]
Master's Degree	140	100	56	40	83	58	1	[3]
Doctor's Degree	227	100	110	48	117	52	–	–
FEDERAL GOVERNMENT	1,208	100	74	6	1,134	94	–	–
No University Education	13	100	1	[3]	12	92	–	–
Some University Education	13	100	–	–	13	100	–	–
Bachelor's Degree	607	100	28	5	579	95	–	–
Bachelor's with Some Post-Graduate Education	78	100	7	[3]	71	91	–	–
Master's Degree	292	100	22	8	270	92	–	–
Doctor's Degree	205	100	16	8	189	92	–	–
PROVINCIAL & MUNICIPAL GOVERNMENTS	783	100	91	12	692	88	–	–
No University Education	25	100	1	[3]	24	96	–	–
Some University Education	21	100	5	[3]	16	76	–	–
Bachelor's Degree	606	100	51	8	555	92	–	–
Bachelor's with Some Post-Graduate Education	27	100	2	[3]	25	93	–	–
Master's Degree	82	100	21	26	61	74	–	–
Doctor's Degree	22	100	11	50	11	50	–	–
HIGH SCHOOLS, TECHNICAL & COMMERCIAL SCHOOLS	344	100	282	82	62	18	–	–
No University Education	9	100	9	[3]	–	–	–	–
Some University Education	11	100	11	100	–	–	–	–
Bachelor's Degree	265	100	210	79	55	21	–	–
Bachelor's with Some Post-Graduate Education	18	100	15	83	3	[3]	–	–
Master's Degree	30	100	26	87	4	[3]	–	–
Doctor's Degree	11	100	11	100	–	–	–	–
Net Total	8,555[1]	100	699	8	7,541	88	315	4
Not Included	2,247[2]	–	–	–	–	–	–	–
Total	10,802	–	–	–	–	–	–	–

[1] Includes seven 1954 graduates.

[2] Of these, 908 worked part-time or less than 10 months during the year; 376 supplied no information, 443 are in architecture, 263 are in veterinary medicine and 162 are in other scientific and technical fields.

[3] Number too small to calculate percentage.

Table 8 – Type of Professional Income Earned by Architects According to Type of Employer and Level of Education, 1957

Type of Employer and Level of Education	Number	Per Cent	TYPE OF PROFESSIONAL INCOME EARNED					
			Salary and Other Professional Income		Salary Only		Other Professional Income Only	
			Number	Per Cent	Number	Per Cent	Number	Per Cent
INDUSTRY	281	100	19	7	134	48	128	45
No University Education	20	100	–	–	8	[2]	12	60
Some University Education	9	100	–	–	5	[2]	4	[2]
Bachelor's Degree	234	100	19	8	113	48	102	44
Bachelor's with Some Post-Graduate Education	8	100	–	–	2	[2]	6	[2]
Master's Degree	9	100	–	–	5	[2]	4	[2]
Doctor's Degree	1	100	–	–	1	[2]	–	–
UNIVERSITIES	9	100	7	[2]	2	[2]	–	–
No University Education	–	–	–	–	–	–	–	–
Some University Education	–	–	–	–	–	–	–	–
Bachelor's Degree	6	100	4	[2]	2	[2]	–	–
Bachelor's with Some Post-Graduate Education	2	100	2	[2]	–	–	–	–
Master's Degree	1	100	1	[2]	–	–	–	–
Doctor's Degree	–	–	–	–	–	–	–	–
FEDERAL GOVERNMENT	19	100	3	[2]	16	84	–	–
No University Education	1	100	–	–	1	[2]	–	–
Some University Education	2	100	–	–	2	[2]	–	–
Bachelor's Degree	14	100	2	[2]	12	86	–	–
Bachelor's with Some Post-Graduate Education	2	100	1	[2]	1	[2]	–	–
Master's Degree	–	–	–	–	–	–	–	–
Doctor's Degree	–	–	–	–	–	–	–	–
PROVINCIAL & MUNICIPAL GOVERNMENTS	37	100	10	27	27	73	–	–
No University Education	8	100	3	[2]	5	[2]	–	–
Some University Education	3	100	–	–	3	[2]	–	–
Bachelor's Degree	18	100	4	[2]	14	78	–	–
Bachelor's with Some Post-Graduate Education	5	100	2	[2]	3	[2]	–	–
Master's Degree	3	100	1	[2]	2	[2]	–	–
Doctor's Degree	–	–	–	–	–	–	–	–
HIGH SCHOOLS, TECHNICAL & COMMERCIAL SCHOOLS	17	100	16	94	1	[2]	–	–
No University Education	–	–	–	–	–	–	–	–
Some University Education	1	100	1	[2]	–	–	–	–
Bachelor's Degree	13	100	12	92	1	[2]	–	–
Bachelor's with Some Post-Graduate Education	1	100	1	[2]	–	–	–	–
Master's Degree	1	100	1	[2]	–	–	–	–
Doctor's Degree	1	100	1	[2]	–	–	–	–
Net Total	363	100	55	15	180	50	128	35
Not Included	80[1]	–	–	–	–	–	–	–
Total	443	–	–	–	–	–	–	–

[1] Of these, 39 gave no income information, and 41 worked part-time or less than 10 months during the year.

[2] Numbers too small to calculate percentages.

Table 9 – Type of Professional Income Earned by Veterinarians According to Type of Employer and Level of Education, 1957

Type of Employer and Level of Education	Number	Per Cent	TYPE OF PROFESSIONAL INCOME EARNED					
			Salary and Other Professional Income		Salary Only		Other Professional Income Only	
			Number	Per Cent	Number	Per Cent	Number	Per Cent
INDUSTRY	99	100	6	[3]	15	15	78	79
Bachelor's Degree	91	100	5	[3]	14	15	72	79
Bachelor's with Some Post-Graduate Education	4	100	–	–	–	–	4	[3]
Master's Degree	3	100	1	[3]	1	[3]	1	[3]
Doctor's Degree	1	100	–	–	–	–	1	[3]
UNIVERSITIES	12	100	3	[3]	9	[3]	–	–
Bachelor's Degree	6	100	1	[3]	5	[3]	–	–
Bachelor's with Some Post-Graduate Education	2	100	1	[3]	1	[3]	–	–
Master's Degree	4	100	1	[3]	3	[3]	–	–
Doctor's Degree	–	–	–	–	–	–	–	–
FEDERAL GOVERNMENT	72	100	5	[3]	67	93	–	–
Bachelor's Degree	65	100	5	[3]	60	92	–	–
Bachelor's with Some Post-Graduate Education	2	100	–	–	2	[3]	–	–
Master's Degree	4	100	–	–	4	[3]	–	–
Doctor's Degree	1	100	–	–	1	[3]	–	–
PROVINCIAL & MUNICIPAL GOVERNMENTS	41	100	10	24	31	76	–	–
Bachelor's Degree	30	100	6	[3]	24	80	–	–
Bachelor's with Some Post-Graduate Education	1	100	1	[3]	–	–	–	–
Master's Degree	8	100	2	[3]	6	[3]	–	–
Doctor's Degree	2	100	1	[3]	1	[3]	–	–
HIGH SCHOOLS, TECHNICAL & COMMERCIAL SCHOOLS[1]	–	–	–	–	–	–	–	–
Net Total	224	100	24	11	122	54	78	35
Not Included	39[2]	–	–	–	–	–	–	–
Total	263	–	–	–	–	–	–	–

[1] None in this category.

[2] Of these, 19 gave no income information, and 20 worked part-time or less than 10 months during the year.

[3] Numbers too small to calculate percentages.

Table 10 – Type of Employer and Year of Bachelor Graduation: Engineers, Scientists, Architects and Veterinarians, 1957

Year of Bachelor Graduation	Number	Per Cent	TYPE OF EMPLOYER				
			Industry	Federal Government	Provincial and Municipal Governments	Universities	High Schools, Technical and Commercial Schools
			Per Cent	Per Cent	Per Cent	Per Cent	Per Cent
Engineers	5,529	100	82	9	7	2	[2]
Before 1918	139	100	73	[2]	16	[2]	–
1918 – 1927	478	100	85	5	7	3	–
1928 – 1937	844	100	83	7	8	2	[2]
1938 – 1947	1,298	100	85	8	5	2	–
1948 – 1957	2,770	100	81	10	7	2	–
Scientists	3,940	100	52	21	12	13	3
Before 1918	52	100	48	[2]	21	[2]	–
1918 – 1927	324	100	39	29	13	16	[2]
1928 – 1937	654	100	48	22	10	17	3
1938 – 1947	964	100	53	23	11	12	1
1948 – 1957	1,946	100	55	19	12	11	3
Architects	384	100	85	4	7	3	[2]
Before 1918	15	100	80	[2]	[2]	–	–
1918 – 1927	34	100	79	[2]	[2]	[2]	[2]
1928 – 1937	72	100	85	[2]	[2]	[2]	–
1938 – 1947	71	100	83	[2]	[2]	[2]	[2]
1948 – 1957	192	100	88	[2]	7	[2]	–
Veterinarians	262	100	48	29	18	5	–
Before 1918	22	100	41	[2]	[2]	[2]	–
1918 – 1927	17	100	29	[2]	[2]	[2]	–
1928 – 1937	35	100	46	37	[2]	[2]	–
1938 – 1947	88	100	48	23	22	[2]	–
1948 – 1957	100	100	53	26	16	[2]	–
Net Total	**10,115**	**100**	**70**	**14**	**9**	**6**	**1**
Not Included	680[1]	–	–	–	–	–	–
Total	10,795	–	–	–	–	–	–

[1] Of the 680 not included, 513 are non-graduates, 162 are in other scientific and technical fields, and 5 supplied no information.

[2] Numbers too small to calculate percentages.

Table 11 – Sex and Work Function of Engineers and Scientists, 1957

Work Function Performed[1]	Number	Per Cent	SEX			
			Male		Female	
			Number	Per Cent	Number	Per Cent
ENGINEERS	5,915	100	5,904	100	11	[3]
Research and Development	561	100	560	100	1	[4]
Designing and Draughting	535	100	533	100	2	[4]
Testing, Inspection, Laboratory Service	163	100	163	100	–	–
Production, Operation, etc.	1,296	100	1,294	100	2	[4]
Supervision	1,023	100	1,023	100	–	–
Administrative, Management and Executive	1,368	100	1,367	100	1	[4]
Teaching, Instructing and Extension Work	125	100	124	99	1	[4]
Purchasing, Marketing, Sales and Service	392	100	392	100	–	–
Consulting and Private Practice	325	100	324	100	1	[4]
Other	127	100	124	98	3	[4]
SCIENTISTS	4,050	100	3,899	96	151	4
Research and Development	1,101	100	1,041	95	60	5
Designing and Draughting	22	100	22	100	–	–
Testing, Inspection, Laboratory Service	272	100	236	87	36	13
Production, Operation, etc.	565	100	561	99	4	[4]
Supervision	489	100	486	99	3	[4]
Administrative, Management and Executive	569	100	568	100	1	[4]
Teaching, Instructing and Extension Work	598	100	561	94	37	6
Purchasing, Marketing, Sales and Service	196	100	194	99	2	[4]
Consulting and Private Practice	104	100	103	99	1	[4]
Other	134	100	127	94	7	[4]
Net Total	**9,965**	**100**	**9,803**	**98**	**162**	**2**
Not Included	830[2]	–	–	–	–	–
Total	10,795	–	–	–	–	–

[1] "Production, Operation, etc." includes installation, erection, maintenance, layout and location, field exploration, and construction. "Supervision" includes supervision of department, district, floor, section. "Other" includes writing, information services, library work, patents, personnel and safety, finance, accounting, budgetary control.

[2] Of 830 not included, 443 are in architecture, 263 in veterinary medicine and 124 in other scientific and technical fields.

[3] Less than 0.5 per cent.

[4] Numbers too small to calculate percentages.

Table 12 – Work Function, Level of Education, and Year of Bachelor Graduation of Engineers, 1957

Level of Education and Year of Bachelor Graduation	Number	Per Cent	WORK FUNCTION PERFORMED[1]									
			Research and Development	Designing and Draughting	Testing, Inspection and Laboratory Services	Production, Operation, etc.	Supervision	Administrative Management and Executive	Teaching Instructing, and Extension Work	Purchasing, Marketing, Sales and Service	Consulting and Private Practice	Other
			%	%	%	%	%	%	%	%	%	%
Bachelor's Degree, and Bachelor's with Some Post-Graduate Education												
Before 1918	128	100	[3]	[3]	[3]	14	12	31	[3]	[3]	18	[3]
1918 – 1927	435	100	5	5	[3]	13	16	46	[3]	4	6	[3]
1928 – 1937	742	100	4	6	3	15	18	41	[3]	4	6	2
1938 – 1947	1,169	100	8	6	2	18	20	30	[3]	7	6	2
1948 – 1957	2,588	100	11	12	4	31	17	9	1	9	4	2
Master's and Doctor's Degrees												
Before 1918	11	100	—	—	—	[3]	[3]	[3]	—	—	[3]	[3]
1918 – 1927	43	100	[3]	—	[3]	[3]	[3]	38	[3]	[3]	[3]	[3]
1928 – 1937	102	100	[3]	11	[3]	[3]	15	39	15	[3]	[3]	[3]
1938 – 1947	129	100	25	[3]	[3]	[3]	10	30	19	[3]	[3]	[3]
1948 – 1957	182	100	28	10	[3]	11	13	10	13	5	6	[3]
Net Total	**5,529**	—	—	—	—	—	—	—	—	—	—	—
Not Included	386[2]	—	—	—	—	—	—	—	—	—	—	—
Total	5,915	—	—	—	—	—	—	—	—	—	—	—

[1] "Production, operation, etc." includes installation, erection, maintenance, layout and location, field exploration, and construction. "Supervision" includes supervision of department, district, floor, section. "Other" includes writing, information services, library work, patents, personnel and safety, finance, accounting, budgetary control and other.

[2] Of these, 385 are non-graduates and 1 supplied no information.

[3] Numbers too small to calculate percentages.

Table 13 – Work Function, Level of Education, and Year of Bachelor Graduation of Scientists, 1957

Level of Education and Year of Bachelor Graduation	Number	Per Cent	WORK FUNCTION PERFORMED[1]									
			Research and Development	Designing and Draughting	Testing, Inspection and Laboratory Services	Production, Operation, etc.	Supervision	Administrative Management and Executive	Teaching Instructing, and Extension Work	Purchasing, Marketing, Sales and Service	Consulting and Private Practice	Other
			%	%	%	%	%	%	%	%	%	%
Bachelor's Degree, and Bachelor's with Some Post-Graduate Education												
Before 1918....	31	100	[4]	[4]	[4]	[4]	[4]	39	—	—	[4]	[4]
1918 – 1927....	178	100	12	[4]	6	8	14	38	13	[4]	[4]	[4]
1928 – 1937....	337	100	11	[4]	5	14	17	31	10	[4]	4	4
1938 – 1947....	589	100	17	—	10	15	17	18	9	8	3	3
1948 – 1957....	1,455	100	22	1	10	21	14	7	13	8	1	3
Master's and Doctor's Degrees												
Before 1918....	21	100	[4]	—	[4]	—	[4]	[4]	[4]	—	[4]	—
1918 – 1927....	148	100	25	—	[4]	[4]	8	26	29	[4]	[4]	[4]
1928 – 1937....	323	100	29	[4]	[4]	6	7	21	28	[4]	3	[4]
1938 – 1947....	383	100	45	—	[4]	7	[4]	10	22	[4]	[4]	3
1948 – 1957....	513	100	60	[4]	2	11	4	3	15	[4]	[4]	2
Net Total	3,978[2]	—	—	—	—	—	—	—	—	—	—	—
Not Included	72[3]	—	—	—	—	—	—	—	—	—	—	—
Total.....	4,050	—	—	—	—	—	—	—	—	—	—	—

[1] "Production, operation, etc." includes installation, erection, maintenance, layout and location, field exploration, and construction. "Supervision" includes supervision of department, district, floor, section. "Other" includes writing, information services, library work, patents, personnel and safety, finance, accounting, budgetary control and other.

[2] This includes 38 in geography,

[3] Of these, 69 are non-graduates and 3 supplied no information.

[4] Numbers too small to calculate percentages.

Table 14 – Year of Birth and Median Age of Scientific and Technical Professionals by Field of Employment Specialization, 1957

Field of Employment Specialization	Number	Median Age	YEAR OF BIRTH									
			Before 1899	1899-1903	1904-1908	1909-1913	1914-1918	1919-1923	1924-1928	1929-1933	1934-1938	1939-1943
Architecture	443	39	65	32	33	46	46	80	73	62	6	–
Engineering	5,915	37	460	380	425	543	773	1,201	1,149	759	225	–
Aeronautical	168	35	2	3	8	11	23	51	38	24	8	–
Chemical	279	34	7	9	7	18	40	67	56	50	25	–
Civil	1,634	37	188	101	120	113	182	304	329	241	56	–
Electrical	1,510	37	101	122	121	134	184	310	304	173	61	–
Mechanical[1]	1,402	37	99	84	80	159	177	312	283	163	45	–
Metallurgical	282	39	16	19	23	32	58	57	40	31	6	–
Mining	337	44	40	33	50	55	59	41	39	16	4	–
Petroleum	303	34	7	9	16	21	50	59	60	61	20	–
Science	2,442	35	85	92	183	231	329	471	498	379	174	–
Biological Sciences	311	34	8	11	25	23	36	57	54	71	26	–
Chemistry	1,224	36	46	50	93	132	185	246	250	149	73	–
Geology, Geochemistry & Geophysics	418	34	15	18	31	28	45	78	98	78	27	–
Mathematics	170	35	7	5	17	18	16	31	25	33	18	–
Physics	319	34	9	8	17	30	47	59	71	48	30	–
Agriculture[3]	1,114	38	84	80	84	114	184	225	207	106	30	–
Forestry[3]	456	37	28	32	30	43	60	107	104	44	8	–
Veterinary Medicine	263	39	40	7	14	23	54	69	36	17	3	–
Net Total	**10,633**	–	**762**	**623**	**769**	**1,000**	**1,446**	**2,153**	**2,067**	**1,367**	**446**	–
Not Included	162[2]	–	–	–	–	–	–	–	–	–	–	–
Total	10,795	–	–	–	–	–	–	–	–	–	–	–

[1] Includes industrial engineering, naval architecture and marine engineering.
[2] These are in other scientific and technical fields.
[3] Agriculture includes agricultural engineering; forestry includes forestry engineering.

Table 15 – Sex and Marital Status of Scientific and Technical Professionals by Field of Employment Specialization, 1957

Field of Employment Specialization	Number	Per Cent	Male		Female		MALE – MARITAL STATUS AND SEX			FEMALE – MARITAL STATUS AND SEX		
							Single	Married	Other[2]	Single	Married	Other[2]
			Number	Per Cent	Number	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent
Architecture	441	100	437	99	4	[4]	14	84	[4]	[4]	—	—
Engineering	5,885	100	5,874	100	11	[5]	12	87	1	[4]	[4]	—
Aeronautical	166	100	164	99	2	[4]	18	80	[4]	—	[4]	—
Chemical	278	100	278	100	—	—	16	84	[4]	—	—	—
Civil	1,624	100	1,623	100	1	[4]	11	88	1	[4]	—	—
Electrical	1,503	100	1,496	99	7	[4]	13	86	1	[4]	[4]	—
Mechanical[1]	1,394	100	1,394	100	—	—	12	87	1	—	—	—
Metallurgical	281	100	280	100	1	[4]	7	91	[4]	—	[4]	—
Mining	336	100	336	100	—	—	6	91	3	—	—	—
Petroleum	303	100	303	100	—	—	16	83	[4]	—	—	—
Science	2,431	100	2,297	95	134	5	18	81	1	65	32	[4]
Biological Sciences	311	100	251	81	60	19	18	81	[4]	58	40	[4]
Chemistry	1,216	100	1,162	96	54	4	14	85	[4]	67	31	[4]
Geology, Geochemistry and Geophysics	416	100	413	99	3	[4]	20	79	[4]	[4]	—	[4]
Mathematics	169	100	160	95	9	[4]	29	70	[4]	[4]	[4]	[4]
Physics	319	100	311	98	8	[4]	22	76	[4]	[4]	[4]	—
Agriculture[6]	1,106	100	1,091	99	15	1	12	87	1	73	[4]	—
Forestry[6]	456	100	456	100	—	—	9	90	[4]	—	—	—
Veterinary Medicine	261	100	256	98	5	[4]	5	94	[4]	[4]	[4]	—
Net Total	**10,580**	**100**	**10,411**	**98**	**169**	**2**	**13**	**86**	**1**	**66**	**31**	[4]
Not Included	215[3]	—	—	—	—	—	—	—	—	—	—	—
Total	10,795	—	—	—	—	—	—	—	—	—	—	—

[1] Includes industrial engineering, naval architecture and marine engineering.
[2] Includes separated, widowed and divorced.
[3] Of these, 161 are in geology and in other scientific and technical fields, and 54 did not supply information.
[4] Numbers too small to calculate percentages.
[5] Less than one-half of one per cent.
[6] Agriculture includes agricultural engineering; forestry includes forestry engineering.

Table 16 – A Comparison of Undergraduate Academic Course[1] and Field of Employment Specialization of Scientific and Technical Professionals, 1957

Field of Employment Specialization	Number	UNDERGRADUATE COURSE[2]																								
		Architecture	Aerenautical Engineering	Chemical Engineering (a)	Civil Engineering (b)	Electrical Engineering	Mechanical Engineering (c)	Metallurgical Engineering	Mining or Petroleum Engineering	General Engineering (d)	Engineering and Business	Biology (e)	Chemistry	Physics and Chemistry	Geosciences (f)	Mathematics	Physics	Mathematics and Physics	Engineering Physics	Geography	Agriculture (g)	Forestry or Forest Engineering	General Sciences(h)	Veterinary Medicine	Other Subjects (i)
Architecture	360	262	–	5	48	6	20	2	1	5	2	1	–	1	–	–	–	–	–	–	4	1	2	–	–
Aerenautical Eng.	112	–	19	1	9	10	46	4	1	3	2	–	1	2	–	–	1	1	4	–	–	2	6	–	–
Chemical Eng.	222	–	–	181	5	7	4	2	2	–	3	–	8	1	–	–	1	–	1	–	–	–	4	–	–
Civil Eng.	1,386	–	1	19	1,129	35	68	4	36	13	2	–	4	–	14	1	–	1	4	–	9	35	10	–	1
Electrical Eng.	1,307	–	–	20	40	1,032	72	3	3	31	7	1	3	–	1	5	6	16	40	–	6	1	19	–	1
Mechanical Eng.[3]	1,184	3	3	62	70	86	809	16	23	25	27	1	11	1	–	2	1	7	5	–	10	9	12	–	1
Metallurgical Eng.	204	–	–	32	4	4	13	110	19	1	1	–	10	–	–	–	–	–	2	–	2	1	5	–	–
Mining Eng.	286	–	–	4	9	2	3	11	240	–	1	1	–	–	12	–	–	–	2	–	1	1	2	–	–
Petroleum Eng.	269	–	–	86	40	13	50	1	47	6	2	–	1	2	8	–	–	–	2	–	5	–	6	–	–
Biological Sciences	98	–	–	2	–	–	–	–	–	–	–	23	2	–	–	–	–	–	–	1	18	1	49	1	1
Chemistry	787	–	–	297	15	9	27	6	6	–	2	11	202	11	5	1	–	–	2	–	60	2	129	–	2
Geology, Geochemistry and Geophysics	189	–	–	–	3	5	1	–	7	–	–	–	1	–	133	2	5	3	5	–	–	–	24	–	–
Mathematics	104	–	–	4	1	3	1	–	1	–	–	–	–	–	–	25	–	30	4	–	5	–	30	–	–
Physics	94	–	–	4	–	8	3	1	–	–	–	2	3	2	–	3	12	16	6	–	2	–	31	–	1
Agriculture[5]	713	1	1	3	2	2	2	–	1	1	–	10	3	–	–	2	–	–	–	–	663	1	7	13	1
Forestry[5]	351	–	–	3	8	4	3	1	1	3	–	1	3	–	–	–	–	–	–	–	1	323	–	–	–
Veterinary Medicine	226	–	–	–	–	–	1	–	–	–	–	1	–	–	–	–	–	–	–	–	4	–	1	219	–
Net Total	7,892	266	24	723	1,383	1,226	1,123	161	388	88	49	52	253	19	173	41	26	74	75	1	792	377	337	233	8
Not Included	2,903[4]	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total	10,795	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

[1] Includes those with some university training but no degree, and those with bachelor's degrees only, who have taken no post-graduate training.

[2] (a) Includes ceramic engineering. (b) Includes municipal, sanitary and traffic engineering. (c) Includes industrial engineering, marine engineering and naval architecture, and textile engineering. (d) Includes electro-mechanical engineering, engineering N.E.C., guided missiles engineering and nuclear engineering. (e) Includes bacteriology, biochemistry, botany, entomology, experimental psychology and zoology. (f) Includes geology, geochemistry, geophysics and geological engineering. (g) Includes agricultural engineering, food technology and soils. (h) Includes science N.E.C., and nuclear physics. (i) Includes non-engineering and non-scientific.

[3] Mechanical engineering includes industrial engineering, naval architecture and marine engineering.

[4] This is made up of 279 with no university training, 2,462 who had post-graduate training, and 162 in other scientific and technical fields.

[5] Agriculture includes agricultural engineering; forestry includes forestry engineering.

Table 17 – A Comparison of Undergraduate Academic Course and Current Function of Professionals in Engineering Fields, 1957

Function[1]	Number	Per Cent	UNDERGRADUATE COURSE[2]																									
			Architecture	Aeronautical Engineering	Chemical Engineering (a)	Civil Engineering (b)	Electrical Engineering	Mechanical Engineering (c)	Metallurgical Engineering	Mining or Petroleum Engineering	General Engineering (d)	Engineering and Business	Biology (e)	Chemistry	Physics and Chemistry	Geosciences (f)	Mathematics	Physics	Mathematics and Physics	Meteorology	Engineering Physics	Geography	Agriculture (g)	Forestry or Forest Engineering	General Science (h)	Veterinary Medicine	Other Subjects (i)
			%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Research and Development	532	10	–	31	16	4	11	9	16	7	[4]	[4]	[4]	[4]	[4]	[4]	–	[4]	[4]	–	26	–	[4]	[4]	18	[4]	–
Designing and Draughting	499	9	–	[4]	6	13	9	12	[4]	[4]	[4]	–	[4]	[4]	–	[4]	–	–	[4]	–	[4]	–	[4]	[4]	[4]	–	–
Testing, Inspection, Laboratory Services	150	3	–	[4]	4	2	3	2	[4]	3	[4]	[4]	–	[4]	–	[4]	[4]	[4]	[4]	–	[4]	–	[4]	–	[4]	–	–
Production and Operation, etc.	1,225	22	–	[4]	21	29	18	19	18	26	24	[4]	–	23	–	19	[4]	[4]	[4]	–	[4]	[4]	22	40	26	–	–
Supervision	961	17	–	[4]	20	15	21	17	20	11	18	23	–	[4]	[4]	19	[4]	[4]	32	–	26	–	[4]	[4]	13	–	–
Administrative, Management and Executive	1,250	23	–	34	18	23	21	23	24	35	17	[4]	[4]	25	[4]	24	[4]	[4]	34	–	[4]	[4]	[4]	[4]	[4]	–	[4]
Teaching, Instructing, and Extension Work	121	2	–	–	3	2	2	2	[4]	[4]	[4]	–	–	[4]	[4]	–	–	[4]	–	–	–	–	[4]	–	[4]	–	–
Purchasing, Marketing, Sales and Service	381	7	–	[4]	7	2	9	10	10	4	[4]	21	–	–	–	[4]	[4]	–	[4]	–	[4]	–	[4]	[4]	[4]	–	–
Consulting and Private Practice	292	5	[4]	–	3	9	4	4	[4]	6	[4]	[4]	–	–	–	[4]	–	[4]	[4]	–	[4]	[4]	[4]	[4]	[4]	–	[4]
Other	119	2	–	[4]	2	1	2	2	[4]	3	[4]	[4]	–	[4]	[4]	[4]	–	–	[4]	–	[4]	–	[4]	[4]	[4]	–	–
Net Total	**5,530**	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	–	100	100	100	100	100	100	100
		–	**1**	**32**	**475**	**1,436**	**1,270**	**1,155**	**207**	**375**	**72**	**56**	**4**	**53**	**10**	**54**	**8**	**17**	**41**	–	**80**	**3**	**46**	**55**	**77**	**1**	**2**
Not Included	385[3]	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total	5,915	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

[1] "Production, operation, etc." includes installation, erection, maintenance, layout and location, field exploration and construction. "Supervision" includes supervision of department, district, floor, section. "Other" includes writing, information services, library work, patents, personnel and safety, finance, accounting, budgetary control and other.

[2] (a) includes ceramic engineering. (b) includes municipal, sanitary and traffic engineering. (c) includes industrial engineering, marine engineering and naval architecture, and textile engineering. (d) includes electro-mechanical engineering, engineering N.E.C., guided missiles engineering and nuclear engineering. (e) includes bacteriology, biochemistry, botany, entomology, experimental psychology and zoology. (f) includes geology, geochemistry, geophysics and geological engineering. (g) includes agricultural engineering, food technology and soils. (h) includes science N.E.C., and nuclear physics. (i) includes non-engineering and non-scientific.

[3] Non-graduates.

[4] Number too small to calculate percentages.

Table 18 – A Comparison of Undergraduate Academic Course and Current Function of Professionals in Science Fields, 1957

Function [1]	Number	Per Cent	UNDERGRADUATE COURSE [2]																										
			Architecture	Aeronautical Engineering	Chemical Engineering (a)	Civil Engineering (b)	Electrical Engineering	Mechanical Engineering (c)	Metallurgical Engineering	Mining or Petroleum Engineering	General Engineering (d)	Engineering and Business	Biology (e)	Chemistry	Physics and Chemistry	Geosciences (f)	Mathematics	Physics	Mathematics and Physics	Meteorology	Engineering Physics	Geography	Agriculture (g)	Forestry or Forest Engineering	General Science (h)	Veterinary Medicine	Other Subjects (i)
			%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Research and Development	1,091	27	–	–	22	*	24	*	*	*	–	–	49	39	29	18	19	45	27	–	47	*	25	18	31	*	*
Designing and Draughting	21	1	–	–	*	–	–	*	–	–	–	–	–	–	–	–	–	*	–	–	*	–	*	*	–	–	–
Testing, Inspection, Laboratory Services	265	7	–	–	6	–	–	*	*	–	–	–	8	12	*	*	–	*	*	–	–	–	7	*	15	*	*
Production, Operation, etc.	560	14	–	*	16	35	*	*	*	*	–	–	*	6	*	40	*	*	12	–	20	–	12	21	10	*	*
Supervision	474	12	–	–	15	*	*	*	*	*	–	*	5	12	*	10	16	*	7	–	*	*	10	24	9	*	*
Administrative Management and Executive	555	14	–	*	25	*	26	35	*	*	–	*	8	13	*	12	16	*	12	–	*	*	11	21	9	*	*
Teaching, Instructing, and Extension Work	597	15	–	–	*	*	*	*	*	*	–	–	22	11	*	9	40	21	29	*	*	*	21	4	18	*	42
Purchasing, Marketing, Sales and Service	194	5	–	–	10	–	*	*	*	*	–	–	*	4	*	*	*	–	*	–	–	–	8	3	4	–	–
Consulting and Private Practice	102	2	–	–	*	*	*	*	–	*	–	–	–	*	*	8	*	–	*	–	*	–	2	5	*	*	*
Other	122	3	–	–	*	*	*	–	–	*	–	–	*	2	*	*	–	*	8	–	*	–	4	*	3	*	*
			–	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Net Total	**3,981**	**100**	–	**2**	**371**	**34**	**46**	**37**	**11**	**33**	–	**2**	**209**	**452**	**49**	**298**	**77**	**85**	**146**	**1**	**64**	**20**	**1,157**	**406**	**439**	**18**	**24**
Not Included	69 [3]	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total	4,050	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

[1] "Production, operation, etc." includes installation, erection, maintenance, layout and location, field exploration and construction. "Supervision" includes supervision of department, district, floor, section. "Other" includes writing, information services, library work, patents, personnel and safety, finance, accounting, budgetary control and other.

[2] (a) Includes ceramic engineering. (b) Includes municipal, sanitary and traffic engineering. (c) Includes industrial engineering, marine engineering and naval architecture, and textile engineering. (d) Includes electro-mechanical engineering, engineering N.E.C., guided missiles engineering and nuclear engineering. (e) Includes bacteriology, biochemistry, botany, entomology, experimental psychology and zoology. (f) Includes geology, geochemistry, geophysics and geological engineering. (g) Includes agricultural engineering, food technology and soils. (h) Includes science N.E.C., and nuclear physics. (i) Includes non-engineering and non-scientific.

[3] Non-graduates.

Table 19 – A Comparison of Province of Employment and Province of Undergraduate Studies, Scientific and Technical Professionals, 1957

Province of Employment	Number	PROVINCE OF UNDERGRADUATE UNIVERSITY										
		Newfoundland	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Universities Outside Canada
Newfoundland	51	—	—	20	8	7	8	—	2	1	—	5
Prince Edward Island	19	—	—	8	3	5	3	—	—	—	—	—
Nova Scotia	237	—	—	142	24	32	22	2	3	2	1	9
New Brunswick	167	—	—	24	99	24	16	—	1	—	2	1
Quebec	2,107	—	—	68	68	1,316	376	58	35	27	37	122
Ontario	3,654	—	—	97	109	298	2,429	166	133	83	114	225
Manitoba	316	—	—	5	6	13	31	196	29	17	7	12
Saskatchewan	301	—	—	2	2	4	36	32	181	17	16	11
Alberta	674	—	—	15	9	24	81	43	76	312	71	43
British Columbia	756	—	—	8	12	25	66	31	34	48	482	50
Yukon & N.W.T.	19	—	—	—	—	1	4	2	—	3	8	1
Net Total	**8,301**	—	—	**389**	**340**	**1,749**	**3,072**	**530**	**494**	**510**	**738**	**479**
Not Included	2,494[1]	—	—	—	—	—	—	—	—	—	—	—
Total	10,795	—	—	—	—	—	—	—	—	—	—	—

[1] Of the 2,494: 1,935 received post-graduate degrees, 516 are non-graduates, and 43 either were employed outside Canada or did not state their place of employment or province of undergraduate education. In addition, 558 Canadian citizens in scientific and technical professions who were living outside Canada were not included in any of these tables. Those who were no longer Canadian citizens have been dropped from the Register and therefore are not included in the survey.

Table 20 – A Comparison of Province of Employment and Province of Post-Graduate Studies, Scientific and Technical Professionals, 1957

Province of Employment	Number	PROVINCE OF POST-GRADUATE UNIVERSITY										
		Newfoundland	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Universities Outside Canada
Newfoundland	13	–	–	–	–	2	8	–	–	–	1	2
Prince Edward Island	9	–	–	1	–	2	2	–	–	–	–	4
Nova Scotia	59	–	–	10	1	15	12	–	1	–	–	20
New Brunswick	42	–	–	1	8	6	8	–	1	–	–	18
Quebec	393	–	–	3	3	159	65	2	3	2	4	152
Ontario	883	–	–	6	6	111	389	7	22	9	25	308
Manitoba	77	–	–	–	–	6	12	20	2	2	–	35
Saskatchewan	79	–	–	–	–	10	8	3	23	2	2	31
Alberta	166	–	–	–	1	13	32	5	6	29	6	74
British Columbia	191	–	–	1	–	14	22	2	2	5	62	83
Yukon & N.W.T.	4	–	–	–	–	–	2	–	–	1	–	1
Net Total	**1,916**	–	–	**22**	**19**	**338**	**560**	**39**	**60**	**50**	**100**	**728**
Not Included	8,879[1]	–	–	–	–	–	–	–	–	–	–	–
Total	10,795	–	–	–	–	–	–	–	–	–	–	–

[1] Of the 8,879 not included, 8,344 received undergraduate degrees only, 516 are non-graduates, and 19 either were employed outside Canada or did not state their place of employment or province of undergraduate education.

Table 21 – A Comparison of Province of Undergraduate University and Province of Post-Graduate University, Scientific and Technical Professionals, 1957

Province of Post-Graduate University	Number	PROVINCE OF UNDERGRADUATE UNIVERSITY										
		Newfoundland	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Universities Outside Canada
Newfoundland	2	–	–	1	–	–	1	–	–	–	–	–
Prince Edward Island	–	–	–	–	–	–	–	–	–	–	–	–
Nova Scotia	43	–	–	35	1	3	1	1	1	–	1	–
New Brunswick	28	–	–	–	25	1	1	1	–	–	–	–
Quebec	454	–	–	27	14	267	63	15	17	17	16	18
Ontario	743	–	–	26	15	37	515	30	31	29	38	22
Manitoba	64	–	–	–	–	1	–	58	3	1	1	–
Saskatchewan	89	–	–	–	–	1	6	2	75	4	–	1
Alberta	77	–	–	1	–	1	4	5	1	64	1	–
British Columbia	150	–	–	1	1	4	8	2	4	1	127	2
Yukon & N.W.T.	–	–	–	–	–	–	–	–	–	–	–	–
Outside Canada	868	–	1	27	25	132	200	66	51	49	99	218
Net Total	**2,518**	**–**	**1**	**118**	**81**	**447**	**799**	**180**	**183**	**165**	**283**	**261**
Not Included	8,277[1]	–	–	–	–	–	–	–	–	–	–	–
Total	10,795	–	–	–	–	–	–	–	–	–	–	–

[1] Of the 8,277: 7,757 received undergraduate degrees only, 516 are non-graduates, 3 did not state the province of undergraduate university, and 1 supplied no information.

Table 22 – A Comparison of Undergraduate Academic Course and Post-Graduate Academic Course, Scientific and Technical Professionals, 1957

Post-Graduate Course[1]	Total	UNDERGRADUATE COURSE[1]																																				
		Architecture	Aeronautical Engineering	Civil Engineering (a)	Mechanical Engineering (b)	Metallurgical Engineering	General Engineering (c)	Engineering and Business	Agricultural Engineering	Agriculture (d)	Bacteriology	Biology	Zoology (e)	Psychology (Experimental)	Biochemistry	Chemistry	Chemical Engineering (f)	Physics and Chemistry	Geology and Geological Science	Geochemistry and Geophysics	Geological Engineering	Mining or Petroleum Engineering	Mathematics	Physics	Mathematics and Physics	Meteorology	Electrical Engineering	Engineering Physics	Forestry	Forest Engineering	Geography	General Science (g)	Veterinary Medicine	Other subjects (h)
Architecture	19	12	–	–	1	–	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1	–	1
City and Regional Planning	18	7	–	6	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Aeronautical Engineering	30	–	7	3	13	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	3	–	–	–
Civil Engineering (a)	117	1	–	106	3	–	–	–	1	–	–	–	–	–	–	2	–	–	–	–	–	–	1	–	1	–	1	5	–	–	–	1	–	–
Sanitary Engineering	25	–	–	24	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Mechanical Engineering (b)	114	–	2	4	86	–	4	–	2	4	–	–	–	–	–	–	–	–	–	–	–	1	–	2	2	–	3	2	–	–	–	1	–	–
Metallurgical Engineering	55	–	–	1	2	31	1	–	–	–	–	–	–	–	–	3	2	–	–	–	1	9	1	–	–	–	1	1	–	–	–	2	–	–
General Engineering (c)	14	–	–	5	2	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	2	2	–	–	–	–	–	–
Engineering and Business	2	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–
Agricultural Engineering	14	–	–	–	–	–	–	–	6	6	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–
Agriculture (d)	232	–	–	9	–	–	–	–	–	212	–	1	–	–	–	2	2	–	–	–	–	–	–	–	–	–	–	–	1	–	2	3	–	–
Bacteriology	76	–	–	–	–	–	–	–	–	36	7	14	–	–	3	2	–	–	–	–	–	–	–	–	–	–	–	–	1	–	9	3	1	–
Biology	89	–	–	–	–	–	–	–	–	40	1	33	2	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	3	–	7	1	1	–
Zoology (e)	160	–	–	–	–	–	–	–	–	51	–	31	39	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	10	2	23	1	2	–
Psychology (Experimental)	11	–	–	–	–	–	–	–	–	1	–	–	–	5	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	3	–
Biochemistry	113	–	–	–	–	–	–	–	–	30	1	8	4	–	14	31	–	1	–	–	–	–	1	1	1	–	–	–	–	–	21	1	2	–
Chemistry	349	–	–	–	1	1	–	–	–	16	–	–	–	–	2	215	34	24	2	–	–	–	1	1	1	–	–	–	–	–	48	–	3	–
Chemical Engineering (f)	85	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6	75	–	–	–	–	–	–	–	–	–	1	–	–	–	3	–	–	–
Physics and Chemistry	11	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4	2	3	–	–	–	–	–	1	–	–	–	–	–	–	1	–	–	–
Geology or Geological Science	219	–	–	2	–	–	1	–	–	1	–	–	–	–	–	2	–	–	112	–	46	25	2	–	1	–	–	1	–	–	–	25	–	1	–
Geochemistry or Geophysics	17	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	1	1	2	–	–	2	2	4	–	–	3	–	–	–	1	–	–	–
Geological Engineering	17	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	–	9	2	–	–	–	–	–	–	–	–	–	1	–	–	–
Mining or Petroleum Engineering	28	–	–	6	–	–	–	–	–	–	–	–	–	–	–	1	3	–	2	–	–	14	–	–	–	–	1	–	–	–	–	1	–	–	–
Mathematics	79	–	–	2	1	–	–	–	–	2	–	–	–	–	–	1	1	–	–	–	–	–	32	–	19	–	7	–	2	1	–	9	–	2	–
Physics	173	–	–	1	–	1	–	–	–	1	–	–	–	–	–	–	–	2	–	–	–	–	2	61	52	–	7	26	–	–	–	18	–	2	–
Mathematics and Physics	16	–	–	2	–	–	–	–	–	1	–	–	–	–	–	1	–	–	–	–	–	–	6	1	–	–	4	–	–	–	–	1	–	–	–
Meteorology	54	–	1	–	–	–	–	–	–	–	–	–	–	–	–	2	–	1	–	–	–	–	3	6	24	1	1	6	–	–	–	9	–	–	–
Electrical Engineering	122	–	1	2	5	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	4	–	90	12	–	–	–	3	–	–	–
Engineering Physics	9	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	5	–	–	–	2	–	–	–
Forestry	62	–	–	–	–	–	–	–	–	3	–	1	–	–	–	–	1	–	–	–	–	–	1	–	–	–	–	–	51	5	–	–	–	–	–
Forest Engineering	7	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	3	–	–	–	–	–
Geography	22	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	18	2	–	1	–
General Science (g)	23	1	–	–	1	–	–	–	–	2	–	1	–	–	–	1	–	2	–	–	–	–	1	1	–	–	–	7	–	1	–	5	–	–	–
Veterinary Science	32	–	–	–	–	–	–	–	–	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	28	–	–	–
Other Subjects (h)	108	1	1	12	23	7	–	11	–	8	–	–	–	–	–	2	11	–	1	1	2	1	1	–	–	–	–	16	3	2	–	–	4	–	1
Net Total	2,522	22	12	188	140	40	10	11	10	422	9	89	46	5	19	276	135	34	122	3	59	52	53	77	109	1	137	74	74	12	22	202	37	20	–	–
Not Included	8,273[2]	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total	10,795	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

[1] (a) Includes municipal, and traffic and highway engineering, (b) Includes industrial, textile, and marine engineering and naval architecture. (c) Includes engineering N.E.C., electro-mechanical engineering, and nuclear engineering. (d) Includes soil and food technology. (e) Includes entomology and botany. (f) Includes ceramic engineering. (g) Includes science, N.E.C., nuclear and atomic physics. (h) Non-engineering and non-scientific.

[2] Of these, 7,757 received undergraduate degrees only and 516 are non-graduates.

Table 23 – Level of Education and Type of Employer: Engineers, Scientists, Architects, Veterinarians, 1957

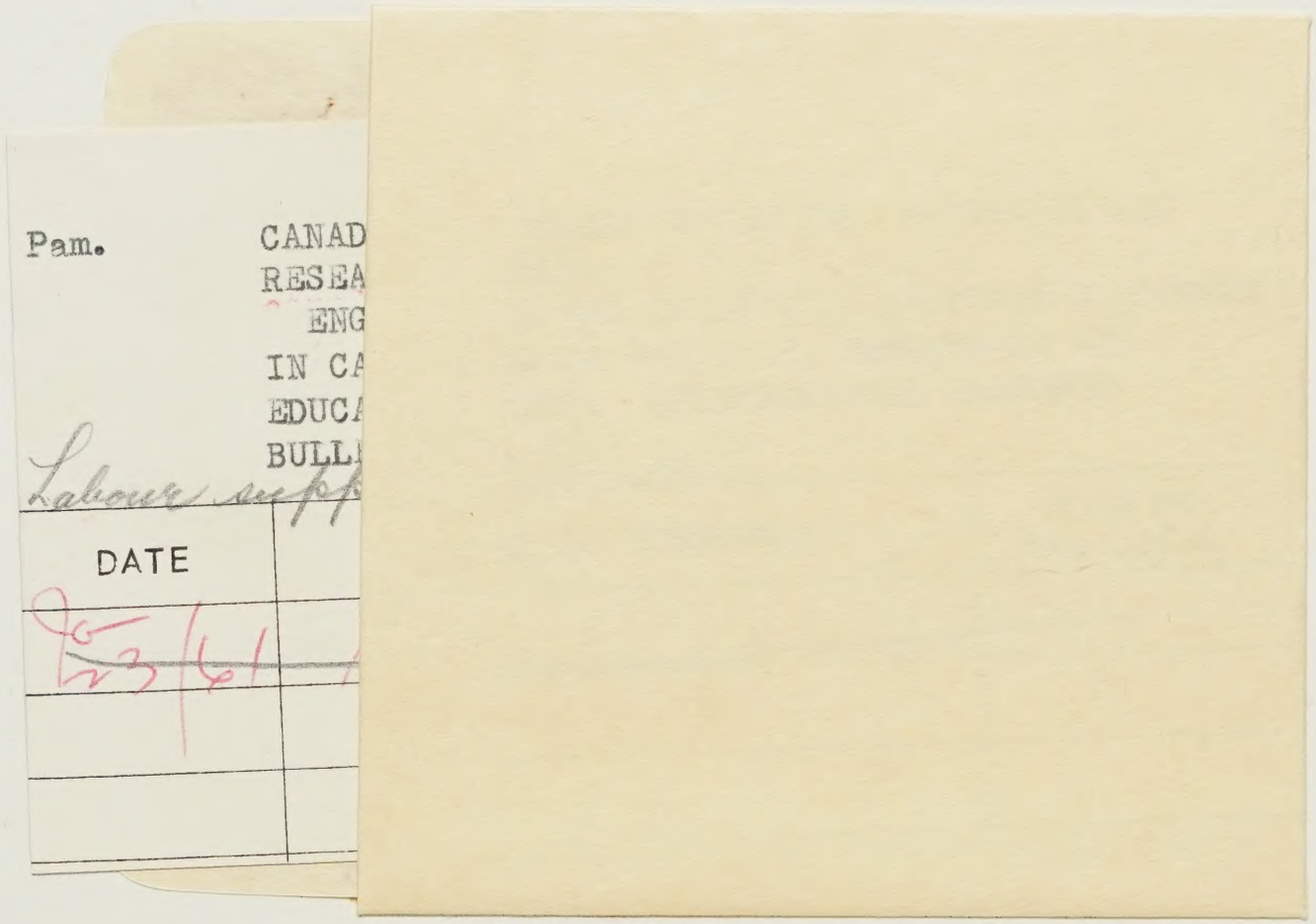
Level of Education: Engineers, Scientists, Architects, Veterinarians	Number	Per Cent	TYPE OF EMPLOYER									
			Industry		Federal Government		Provincial and Municipal Governments		Universities		High Schools Technical and Commercial Schools, etc.	
			No.	%	No.	%	No.	%	No.	%	No.	%
ENGINEERS	5,915	100	4,862	82	501	9	427	7	123	2	2	[3]
No University Education	209	100	174	83	10	4	23	11	1	1	1	[3]
Some University Education	176	100	145	83	9	5	22	12	—	—	—	—
Bachelor's Degree	4,794	100	4,027	84	393	8	336	7	37	1	1	[3]
Bachelor's and Some Post-Graduate Education	269	100	209	78	30	11	16	6	14	5	—	—
Master's Degree	388	100	257	66	51	13	28	7	52	14	—	—
Doctor's Degree	79	100	50	63	8	10	2	3	19	24	—	—
SCIENTISTS	4,012	100	2,100	52	837	21	470	12	497	12	108	3
No University Education	31	100	24	77	3	10	4	13	—	—	—	—
Some University Education	38	100	29	77	5	13	2	5	2	5	—	—
Bachelor's Degree	2,298	100	1,491	65	294	13	341	15	77	3	95	4
Bachelor's and Some Post-Graduate Education	273	100	127	47	66	24	33	12	42	15	5	2
Master's Degree	719	100	247	34	264	37	66	9	134	19	8	1
Doctor's Degree	653	100	182	28	205	31	24	4	242	37	—	—
ARCHITECTS	443	100	370	84	19	4	41	9	11	3	2	[3]
No University Education	39	100	28	72	1	3	10	25	—	—	—	—
Some University Education	20	100	15	75	2	10	3	15	—	—	—	—
Bachelor's Degree	340	100	298	88	14	4	18	5	8	2	2	1
Bachelor's and Some Post-Graduate Education	25	100	15	60	2	8	6	24	2	8	—	—
Master's Degree	17	100	12	[2]	—	—	4	23	1	6	—	—
Doctor's Degree	2	100	2	[2]	—	—	—	—	—	—	—	—
VETERINARIANS	263	100	126	48	76	29	47	18	14	5	—	—
Bachelor's Degree	226	100	117	52	69	30	34	15	6	3	—	—
Bachelor's and Some Post-Graduate Education	10	100	4	40	2	20	1	10	3	30	—	—
Master's Degree	23	100	4	[2]	4	[2]	10	[2]	5	22	—	—
Doctor's Degree	4	100	1	[2]	1	[2]	2	[2]	—	—	—	—
Net Total	10,633	100	7,458	70	1,433	14	985	9	645	6	112	1
Not Included	162[1]	—	—	—	—	—	—	—	—	—	—	—
Total	10,795	—	—	—	—	—	—	—	—	—	—	—

[1] These are in other scientific and technical fields.
[2] Percentages omitted because base numbers small.
[3] Less than one-half of 1 per cent.

Table 24 – Sex, Level of Education, and Field of Employment Specialization, Scientific and Technical Professionals, 1957

Field of Employment Specialization	Number	Per Cent	TOTAL				MALE – LEVEL OF EDUCATION						FEMALE – LEVEL OF EDUCATION					
			Male		Female		No University	Some University	Bachelor's Degree	Bachelor's Degree and Some Post-Graduate	Master's Degree	Doctor's Degree	No University	Some University	Bachelor's Degree	Bachelor's Degree and Some Post-Graduate	Master's Degree	Doctor's Degree
			No.	Per Cent	No.	Per Cent	%	%	%	%	%	%	%	%	%	%	%	%
Architecture	443	100	439	99	4	1	9	5	77	5	4	–	[4]	–	[4]	[4]	–	–
Engineering	5,915	100	5,904	100	11	[3]	3	3	81	5	7	1	9	–	64	9	18	–
Aeronautical	168	100	166	99	2	1	2	3	64	11	16	4	–	–	[4]	–	[4]	–
Chemical	279	100	279	100	–	–	1	1	78	5	9	6	–	–	–	–	–	–
Civil	1,634	100	1,633	100	1	[3]	3	3	82	4	7	1	–	–	[4]	–	–	–
Electrical	1,510	100	1,503	99	7	1	4	3	84	4	4	1	–	–	[4]	[4]	[4]	–
Mechanical[1]	1,402	100	1,402	100	–	–	4	3	81	5	6	1	–	–	–	–	–	–
Metallurgical	282	100	281	100	1	[3]	2	1	71	7	12	7	[4]	–	–	–	–	–
Mining	337	100	337	100	–	–	7	4	81	3	4	1	–	–	–	–	–	–
Petroleum	303	100	303	100	–	–	1	2	87	3	6	1	–	–	–	–	–	–
Science	2,442	100	2,308	95	134	5	1	1	51	7	19	21	–	–	60	10	16	14
Biological Sciences	311	100	251	81	60	19	–	–	25	11	26	38	–	–	58	7	18	17
Chemistry	1,224	100	1,170	96	54	4	1	1	63	6	13	16	–	–	67	15	11	7
Geology, Geochemistry and Geophysics	418	100	415	99	3	1	[3]	1	44	9	21	25	–	–	[4]	–	[4]	[4]
Mathematics	170	100	161	95	9	5	–	–	61	7	15	17	–	–	[4]	–	[4]	[4]
Physics	319	100	311	98	8	2	[3]	1	29	10	33	27	–	–	[4]	[4]	[4]	[4]
Agriculture[5]	1,114	100	1,099	99	15	1	[3]	1	63	6	19	11	–	–	54	13	13	20
Forestry[5]	456	100	456	100	–	–	3	2	75	4	12	4	–	–	–	–	–	–
Veterinary Medicine	263	100	258	98	5	2	–	–	86	4	8	2	–	–	[4]	[4]	[4]	–
Net Total	10,633	100	10,464	98	169	2	3	2	72	5	11	7	1	–	59	11	16	13
Not Included	162[2]	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total	10,795	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

[1] Mechanical engineering includes industrial engineering, naval architecture and marine engineering.
[2] These are working in other scientific and technical fields.
[3] Less than one-half of 1 per cent.
[4] Percentages omitted because base numbers small.
[5] Agriculture includes agricultural engineering; forestry includes forestry engineering.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